REDACTED – FOR PUBLIC INSPECTION

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September 17, 2018

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Misuse of Internet Protocol (IP) Captioned Telephone Service*, CG Docket No. 13-24, *Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, CG Docket No. 03-123

Dear Ms. Dortch:

CaptionCall, LLC herein submits a redacted version of its Comments and Exhibits in the above-referenced proceedings.

CaptionCall is submitting a Highly Confidential version of these Comments and Highly Confidential Exhibit C pursuant to the *Third Protective Order* adopted in the above-captioned dockets.[1] CaptionCall has designated for Highly Confidential and Confidential treatment the marked portions of the attached documents pursuant to the *Third Protective Order*.

Specifically, CaptionCall's comments include discussions and analysis of information contained in Revised Exhibit 1-3.1 of the TRS Fund Administrator's 2018 TRS Rate Filing,[2] which has been designated as Highly Confidential.[3] CaptionCall also is including in its Comments information

[1] *See In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Order and Third Protective Order, CG Docket Nos. 03-123, 10-51, 13-24, 2018 WL 3528319 (2018) ("*Third Protective Order*").

[2] Rolka Loube Associates LLC, Interstate Telecommunications Relay Services Fund Payment Formula and Fund Size Estimate, CG Docket Nos. 03-123 and 10-51 (2018); *see also* Letter from David Rolka, President, Rolka Loube Associates, LLC, to Marlene Dortch, Secretary, FCC, CG Docket Nos. 03-123 and 10-51, at 1 (May 25, 2018); Letter from David Rolka, President, Rolka Loube Associates, LLC, to Marlene Dortch, Secretary, FCC, CG Docket Nos. 03-123 and 10-51 at 1 (May 1, 2018).

[3] *Third Protective Order* ¶ 7; *see also Id.* App. B; Letter from Eliot Greenwald, Deputy Division Chief, Disability Rights Office, CGB, FCC to Marlene H. Dortch, Secretary, FCC, Docket Nos. 13-24 and 03-123 (July 24, 2018).

falling in to the following category: "Granular information regarding its "current or future costs, revenues, marginal revenues, profits, dividends, market share, or customers" and "[i]nformation that discussed in detail the number or anticipated changes in the number of customers or amount of traffic, including levels or patterns of usage, churn rate data, detailed information about why customers discontinue service, numbering assignments, and customer complaints."[4] This information is also designated as Highly Confidential. CaptionCall is also including in its Comments and the Exhibit certain information about accounting methodologies that is not otherwise available from public sources and is confidential and proprietary business information.

Pursuant to the *Third Protective Order*, CaptionCall is submitting a Highly Confidential version of each document for the Secretary and two copies of each Highly Confidential document for Eliot Greenwald; CaptionCall is also filing a redacted version of the documents electronically via ECFS. Electronic copies of the Highly Confidential Documents are also being sent by email to TRSReports@fcc.gov and Eliot Greenwald.

Please contact me if you have any questions or require any additional information.

Sincerely,

/s/
Rebekah P. Goodheart

Enclosures

cc: Eliot Greenwald
TRSReports@fcc.gova

[4] *Third Protective Order* Appendix B.

REDACTED – FOR PUBLIC INSPECTION

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Misuse of Internet Protocol (IP) Captioned Telephone Service	)	CG Docket No. 13-24
Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities	)	CG Docket No. 03-123

COMMENTS OF CAPTIONCALL, LLC

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September 17, 2018

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Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities	)	CG Docket No. 03-123

COMMENTS OF CAPTIONCALL, LLC

CaptionCall, LLC hereby submits these comments on the Commission's *Further Notice of Proposed Rulemaking* ("*Further Notice*") in the above-captioned docket.

INTRODUCTION AND EXECUTIVE SUMMARY

CaptionCall shares the Commission's goal of ensuring that Internet-Protocol Captioned Telephone Service ("IP CTS") remains available for all who need it. CaptionCall has seen firsthand that IP CTS is life changing for individuals with hearing loss. It allows individuals who retain some residual hearing as well as the ability to speak to continue to communicate in their own voices. In this respect alone, IP CTS enables effective communications by telephone in a way that other telecommunications relay services ("TRS") and other assistive technologies often cannot. But IP CTS offers many benefits relative to other assistive technologies as well. It is easy to use. It does not require a user to be comfortable with two-way text-based communications. It addresses a specific listening situation (the telephone) in which amplification alone is often ineffective. And new studies show that IP CTS is uniquely effective at mitigating the increased cognitive difficulties of extracting meaning from spoken words for individuals with hearing loss.

In short, IP CTS often comes closest among assistive technologies to delivering communications by telephone that are "functionally equivalent" to those of individuals without hearing loss, as mandated by the Americans with Disabilities Act ("ADA").[1]

In the *Further Notice*, the Commission incorrectly presumes that growth in demand for IP CTS service is inherently suspect, assuming that it must be the result of waste, fraud, or abuse. It is not. Rather, the growth in demand simply reflects the growth in the number of individuals experiencing—and diagnosed with—hearing loss. While there is a record-based, demographic explanation for the increased demand for IP CTS, there is no basis for the *Further Notice*'s charges of systematic waste, fraud, and abuse in the IP CTS program. The Commission has already been admonished by the U.S. Court of Appeals for the D.C. Circuit once for adopting rules in an effort to "defeat a bogeyman whose existence was never verified, *i.e.*, the fraudulent use of IP CTS technology."[2] It should not repeat the same mistake again and adopt rules aimed at curbing potential fraud in the IP CTS program when it does not have any "evidence suggesting there is fraud to deter."[3]

Although there is no evidence of fraud or abuse, CaptionCall nonetheless supports the Commission's goals to modernize the program through targeted reforms designed to improve providers' efficiency and encourage innovation and competition. But those reforms must not compromise Section 225's "primary objective," which is to ensure that services that enable effective communications by telephone are available to individuals with speech and hearing

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[1] *See* The Americans with Disabilities Act of 1990, Pub. L. No. 101-336, § 401, 104 Stat. 327, 366-69 (codified at 47 U.S.C. § 225).

[2] *Sorenson Commc'ns, Inc. v. FCC*, 755 F.3d 702, 710 (D.C. Cir. 2014).

[3] *Id.* at 707-08.

impairments.[4] The Commission must therefore be careful to avoid reforms that make IP CTS less available to—or more difficult to access by—individuals who need it. Such reforms would be contrary to both the ADA and the Administrative Procedure Act ("APA"). CaptionCall thus urges the Commission to adopt only those reforms for the IP CTS program regarding (1) user eligibility, (2) provider practices, and (3) compensation rates that are consistent with the following framework.

First, CaptionCall supports the adoption of targeted and narrowly tailored rules regarding *User Eligibility*.

CaptionCall is committed to protecting the integrity of the TRS Fund and preventing the introduction of waste, fraud, or abuse, into the IP CTS program. Indeed, although not required to do so, CaptionCall provides service to IP CTS users only after receiving independent third-party certifications, signed by HHPs, under penalty of perjury, that specifically attest to each new user's need for the service.[5] Thus, CaptionCall generally supports the Commission's proposal to adopt a similar third-party certification framework that would apply to *all* IP CTS providers. Moreover, CaptionCall supports limiting eligibility for new users based on certifications from independent HHPs, and requiring those certifications to be made under penalty of perjury and to contain certain *additional* attestations beyond what was specified in the 2013 interim rules, described in greater detail below. These additional requirements will build on existing federal and state law and professional codes, thereby helping to prevent any possible waste, fraud, and abuse from entering the IP CTS program. Other aspects of the Commission's proposed rules for third-party eligibility

[4] *See Sorenson Commc'ns, LLC v. FCC*, 897 F.3d 214, 227-28 (D.C. Cir. 2018).

[5] CaptionCall also provides service to a *de minimis* number of users who purchase IP CTS equipment for $75 or more.

certifications, however, risk depriving individuals with hearing loss of access to IP CTS, raise significant concerns under the First Amendment and the Fifth Amendment's Due Process Clause, and/or address only speculative harms, as CaptionCall explains further below.

Although CaptionCall welcomes states that choose to play a role in IP CTS and hopes to work with states that do so, the Commission should not mandate state involvement. As a threshold matter, it is unclear that Sections 2(b) and 225 permit state TRS programs to regulate IP CTS, which is an interstate information service. But even if devolution were statutorily permissible, it would impose substantial costs—either to the states, as an unfunded mandate, or to the TRS Fund, frustrating the Commission's objective of generating TRS Fund savings—and would create substantial inefficiencies through overlapping regulation. While the Commission attempts to quantify the costs for states to conduct all new user eligibility assessments going forward, its projection is based on flawed assumptions and is substantially understated. Additionally, states should not be the sole option for individuals with hearing loss to be certified as eligible for IP CTS; it is critical that individuals be permitted to go to their own HHPs. The costs of devolution would dramatically outweigh any marginal benefits from having states, rather than the Commission, oversee the IP CTS program.

Second, as to *Provider Practices*, although CaptionCall supports the Commission's goal of ensuring that the IP CTS program remains free of waste, fraud, and abuse, several of the Commission's proposals regarding marketing, device installation and reclamation, on-off captioning functionality, and Communication Assistant ("CA") monitoring are unnecessary, unlawful, or otherwise harmful to individuals with hearing loss. CaptionCall therefore urges the Commission to refrain from adopting these proposals at this time.

Third, as to *Compensation Rates*, CaptionCall encourages the Commission to maintain market-based rates for IP CTS. To do so, CaptionCall urges the Commission to adopt a price cap, setting the initial rate at $1.75 per minute, with the rate to be adjusted annually for inflation and productivity during a three-to-five-year rate period. At the conclusion of the rate period, the Commission could reevaluate the productivity factor or conduct a reverse auction. CaptionCall has developed a framework for such an auction, which is set out herein. This framework would best replicate competitive-market incentives and would drive providers to achieve efficiencies and innovations. However, regardless of how the Commission ultimately sets rates for IP CTS providers, it should do so uniformly. It should not set a separate rate for automatic speech recognition ("ASR"). For the same reason, if the Commission sets rates based on providers' average allowed costs, it should treat IP CTS providers' costs, including intellectual-property licensing costs, uniformly.

In sum, CaptionCall supports the Commission's efforts to modernize the IP CTS program to ensure individuals with hearing loss achieve functional equivalence in their telephone communications. CaptionCall urges the Commission to reform the program in a manner that incentivizes providers to deliver efficient and innovative service.

I. Background.

Under the ADA, individuals with hearing- and speech-related disabilities have a right to TRS[6]—services that "enable [such] individuals . . . to communicate with other[s] in a manner that is functionally equivalent to a hearing individual's ability to communicate using voice

[6] 47 U.S.C. § 225(a)(3), (b)(1).

communications services"[7]—at a cost to the end user consumer no greater than that of ordinary phone service. Congress mandated that the Commission ensure that TRS are "available to the extent possible and in the most efficient manner."[8]

Captioned Telephone Services ("CTS") are a form of TRS that provide eligible users experiencing hearing loss with text captions of what another party is saying on the other end of the telephone.[9] CTS users typically receive a special telephone that allows the user to simultaneously listen to the other party and read text captions of the other party's speech.[10]

IP CTS is a specific sub-type of CTS that enables an individual to use "a telephone and an Internet Protocol-enabled device via the Internet to simultaneously listen to the other party and read captions of what the other party is saying."[11] When an IP CTS user begins a phone conversation with another party, he or she is connected to a CA employed by the IP CTS provider. Most providers, including CaptionCall, employ CAs who uses a combination of ASR technology and manual transcription to transcribe the other party's speech, which the IP CTS provider then

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[7] *See In re Misuse of Internet Protocol (IP) Captioned Telephone Service*, Order and Notice of Proposed Rulemaking, 28 FCC Rcd 703, 703-04 ¶ 4 (2013) (internal quotation marks omitted) ("*2013 Interim Order*"), *vacated in part by Sorenson Commc'ns Inc. v. FCC*, 755 F.3d 702 (D.C. Cir. 2014).

[8] 47 U.S.C. § 225(b)(1).

[9] *In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Report and Order and Declaratory Ruling, 22 FCC Rcd 20,140, 20,142 ¶ 1 n.9 (Oct. 26, 2007) ("*2007 Rate Order*"). CaptionCall's phones are certified as telephones under Part 68.

[10] *2007 Rate Order*, 22 FCC Rcd at 20,142 ¶ 1 n.6.

[11] *In re of Misuse of Internet Protocol (IP) Captioned Telephone Service*, Report and Order, Declaratory Ruling, Further Notice of Proposed Rulemaking, and Notice of Inquiry, CG Docket Nos. 13-24, 03-123, FCC 18-79 ¶ 3 (rel. June 8, 2018) (quotation marks omitted) ("*Further Notice*").

transmits as captions to a screen on the user's phone. The service is thus invisible to the user's conversation partner and is marked by "ease and convenience of use."[12]

II. IP CTS Comes Closest among TRS to Achieving ADA-Mandated Functional Equivalence for People with Some Residual Hearing Who Can Speak.

IP CTS generally is used by individuals who have either developed or "aged" into hearing loss later in life, but still have some residual hearing and the ability to speak. It has been a life-changing service for many of CaptionCall's customers—including older individuals and veterans suffering from traumatic brain injury—enabling them to communicate freely and live independently. As the population of individuals with hearing loss grows, researchers are increasingly focused on studying the science of hearing loss. As discussed below, new studies have demonstrated the importance of captioning to enable communications for those with hearing impairments.

A. Captioning Contributes to Functional Equivalence by Allowing Individuals to Communicate in Their Own Voices and to Hear What They Can, Which Is Essential for a Growing Population of Individuals with Hearing Loss.

IP CTS allows the user to speak in her own voice and to hear what she can of the other party's voice, while also providing the benefit of live captioning. IP CTS thus permits real-time voice interaction between the user and the counter-party. This is an important advantage of IP CTS, as compared with other forms of TRS such as TTY or IP Relay, and also distinguishes IP

[12] *2013 Interim Order*, 28 FCC Rcd at 716 ¶ 20. The IP architecture of IP CTS offers numerous benefits relative to analog CTS. With analog CTS, users had to call or be called via a central number (for 1-line CTS), or had to have two telephone lines (2-line CTS). With IP CTS, the user needs only the underlying telephone line, which can be his or her existing telephone number, and can receive captions for any call placed to or from that number. Instead of traveling over phone lines, audio is delivered to the IP CTS provider and captions are received by the end user over the internet, independent of the voice call. In addition, IP CTS can offer individuals the flexibility and portability of using a computer, smartphone, or tablet to receive captions. For the same reason, IP CTS is more accessible to a wider group of individuals, including people who are blind, have low vision, or are deaf-blind, because they can use larger texts, variable fonts, variable colors, and so forth.

CTS from non-TRS such as Real-Time Text ("RTT"). As the Commission has acknowledged, "unlike most other forms of TRS, IP CTS is capable of being used without any interruption in the normal flow of a voice telephone conversation."[13]

In recent years, the class of people with a need for—and ADA entitlement to—IP CTS has expanded. America's population of people who are 65 or older has grown as medicine has advanced and, as discussed below, this group experiences hearing loss at a much greater incidence than younger Americans. These are CaptionCall's core users: 71 percent of CaptionCall users are 72 or older, and 9 percent are more than 100 years old. Approximately 90 percent of CaptionCall customers have one or two hearing aids, and another 2 percent have cochlear implants. Moreover, our nation's veterans increasingly face hearing loss for a variety of reasons, including as a result of suffering traumatic brain injury; as a result of exposure to blasts, even where there appears to be no obvious injury; and simply as a result of growing older. Indeed, the U.S. Department of Veterans Affairs reports that hearing problems are "by far the most prevalent service-connected disability among American Veterans" and that, as of 2014, more than 930,000 veterans were receiving disability benefits related to hearing loss.[14]

IP CTS users have attested to the importance of the service for achieving the functional equivalence mandated by the ADA.[15] For example, one customer said that her CaptionCall service

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[13] *2013 Interim Order*, 28 FCC Rcd at 716 ¶ 20.

[14] Office of Research & Dev., U.S. Dep't of Veterans Affairs, *Hearing Loss*, https://www.research.va.gov/topics/hearing.cfm (last visited Sept. 10, 2018). Currently, approximately 4 percent of CaptionCall's users are certified through the Department of Veterans Affairs—and there are likely many more veterans who are CaptionCall users who were certified through third-party HHPs.

[15] *See* Sergei Kochkin, *The Importance of Captioned Telephone Service in Meeting the Communication Needs of People with Hearing Loss* 34 (CaptionCall, LLC 2013), https://login.captioncall.com/CaptionCall/media/Blog/KochkinWhitepaper_052813_TA17132_FINAL.pdf ("Communicating on the telephone was rated the second-highest

"has been a lifesaver" because, prior to getting IP CTS, she was unable to understand her grandchildren due to "the tone of their voices."[16] A World War II veteran reports that his CaptionCall phone is a "very helpful communication tool" that he finds especially useful when communicating with those who speak quickly or have accents.[17] Other customers report that IP CTS is particularly important in allowing them to navigate doctors' appointments,[18] engage in needed communications with pharmacies,[19] and, when necessary, place calls to, and interact with, 911. One user explained that she used her CaptionCall device to contact 911 after her husband had a heart attack and that, if she had not had access to her device, she "would never have been able to understand the dispatchers for Emergency Responders." Still others say that the system is very important for older Americans suffering from depression due to their prior difficulty contacting friends and family.

The importance of IP CTS to consumers with hearing loss is difficult to overstate. Without access to IP CTS, many Americans would lack independence because they would not be able to communicate using the telephone with family and friends, doctors, businesses and service providers—or to access and use critical emergency services, such as 911.

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important listening situation behind one-on-one communication. A total of 57% of people with hearing loss indicated communicating on the telephone was 'very important' to them.").

[16] CaptionCall, Life is Calling: Testimonial Booklet at 5 (Jan. 4, 2018) ("Booklet") (testimonial of JP from Alexandria, VA). A copy of the Booklet is attached as Appendix A.

[17] Booklet at 2 (testimonial of Joe from Des Moines, IA). Another veteran from Oregon reports that the phone has allowed him to get "back in society full time." Booklet at 4 (testimonial of Stan from Bend, OR).

[18] Booklet at 4 (testimonials of L.J. from Bulverde, TX and Bobbie from Albertville, AL).

[19] Booklet at 7 (testimonial of Sandi from Mesa, AZ).

B. Studies Demonstrate That Captioning Mitigates the Increased Cognitive Difficulties of Extracting Meaning from Spoken Words for Individuals with Hearing Loss, Which Is Necessary to Achieve "Functional Equivalence."

It is critical for the Commission to evaluate the current academic literature and science on hearing loss and speech comprehension as it contemplates reforms to the IP CTS program. Taking full account of the research will ensure that this process is based on sound and rigorous data. This research suggests that "effective communication"—a term the Commission has used to describe the goals of the program[20]—should be defined in terms of not only whether the person can "hear" a conversation, but also whether the person can extract meaning—*i.e.*, whether he or she understands and remembers what is being communicated. Indeed, recent studies show that, as a result of hearing loss, individuals also experience other cognitive challenges that affect their ability to participate in and experience communications. As set forth below, captioning has significant promise at offsetting the negative effects of hearing loss on comprehension and memory.

Dr. Brennan Payne has summarized the existing literature on hearing loss and captioning, which shows that even when adults in a difficult listening environment can successfully identify spoken words, subsequently extracting meaning from those words requires additional cognitive effort, which can adversely affect comprehension and memory.[21] Individuals who experience hearing loss are constantly expending additional cognitive effort to identify spoken words and assess their meaning. The cognitive demand or "load" associated with this "perceptual decoding"

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[20] *Further Notice* ¶¶ 9, 42.

[21] *See* Brennan Payne, *Text Captioning and Speech Understanding: A Literature Review* 1 (CaptionCall 2018). Dr. Payne is an Assistant Professor of cognition and neural science at the University of Utah. His literature review is attached as Appendix B.

is an "oft-cited *hidden effect* of hearing loss."[22] Indeed, when cognitive load is increased—as by noisy environments—the ability to comprehend and remember speech declines.[23]

The primary methods that have been identified for improving comprehension and memory by alleviating cognitive load include "speech reading" (which allows the listener to interpret visual cues) and captioning (which allows the listener to see text).[24] Thus, "[t]he visual presentation of captioned speech offers a promising route that may reduce the cognitive workload of auditory perceptual decoding in the face of age-related hearing loss and environmental noise."[25] In short, the addition of text-based captions can mean the difference between a sustained failure to understand speech and high levels of speech comprehension.[26]

C. Other Assistive Technologies, Such as Amplification and RTT, Are Often Unsuitable for the Current IP CTS User Base.

Academic research as well as testimonial evidence show that hearing aids and other assistive technologies are often insufficient to achieve effective communication by telephone for users with hearing loss.[27] Many CaptionCall customers who have hearing aids or cochlear implants have reported that their "[n]ew expensive hearing aids did not help" them understand

[22] *See id.*

[23] *See id.*

[24] *See id.*

[25] *Id.*

[26] *See id.*

[27] *See Further Notice* ¶ 154.

counterparties on the phone[28] and that even with hearing aids or other assistive technologies, they were unable to "take care of business over the phone"[29] before they started using IP CTS.

The *Further Notice* nonetheless seems to suggest "many . . . individuals with hearing loss" do not need IP CTS because other assistive technologies (such as advanced amplification and RTT) are available to individuals with hearing loss.[30] This premise ignores the fact that the effects of hearing loss—and the appropriate treatments for different contexts—are highly complex. The overwhelming majority of CaptionCall's IP CTS users already had at least one hearing aid (and possibly a cochlear implant) and were *still* having difficulty using their traditional telephones to conduct everyday business. In fact, according to survey research for the hearing aid industry, the level of user satisfaction with hearing aids when it comes to the specific listening experience of talking on the phone is consistently among the lowest of all areas assessed,[31] and difficulty with the phone is one of the most frequently cited reasons for individuals with hearing loss not to own hearing aids.[32]

Moreover, other assistive technologies are often insufficient to deliver effective communications for individuals with hearing loss. Amplification is the most applied modality in addressing hearing loss. CaptionCall's equipment (like that of most providers) offers both

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[28] Booklet at 3 (testimonial of Hank from Romulus, MI).

[29] Booklet at 7 (testimonial of Jack from Houston, TX).

[30] *Further Notice* ¶ 9 ("Many other individuals with hearing loss are likely to be able to communicate effectively by phone through the use of hearing-aid compatible handsets, Bluetooth devices, or specialized devices such as enhanced amplification (also called 'high-gain') telephone.").

[31] *See* Harvey B. Abrams & Jan Kihm, *An Introduction to MarkeTrak IX: A New Baseline for the Hearing Aid Market*, Figure 9, Hearing Review (May 15, 2015), http://www.hearingreview.com/2015/05/introduction-marketrak-ix-new-baseline-hearing-aid-market/; *see also* Kochkin, *supra* note 15, at 34.

[32] *See* Kochkin, *supra* note 15, at 35.

amplification and captioning functionality, and for many users the combination is critical to achieve effective communications by telephone.[33] As the American Academy of Audiology has explained, there are multiple factors that affect the ability to communicate by phone, including external factors such as the bandwidth of the device, the intensity level of the spoken phone signal, device fidelity, environmental and background noise, and internal factors such as the listener's age, hearing ability, speech understanding, cognitive capacity, and comorbidities.[34] Indeed, the Commission previously has reached the same conclusion.[35] That is also why amplification alone, while helpful for certain consumers, is often insufficient. For example, amplification alone may be insufficient when a grandparent speaks to a grandchild (or another loved one with a high-frequency voice); when a patient or client speaks to professionals such as doctors, lawyers, or computer-repair technicians (who may use vocabulary that can be difficult to understand); or when an individual talks with someone who speaks with an accent. Amplification is also ineffective when any party to a conversation is in an area with high background noise. As the Food and Drug Administration has explained, amplification technologies generally "amplify *all* sounds, including background noise that [users] do not wish to hear."[36] Because amplification without sophisticated

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[33] These functions have been decoupled on CaptionCall's phones since before the Commission adopted a decoupling requirement.

[34] *See* American Academy of Audiology Comments, CG Docket Nos. 03-123 and 13-24, at 2-3 (Sept. 7, 2018) ("*AAA Comments*") (describing the factors that affect ability to communicate by phone).

[35] *See In re Misuse of Internet Protocol (IP) Captioned Telephone Service*, Report and Order and Further Notice of Proposed Rulemaking, 28 FCC Rcd 13,420 13,457-59 ¶¶ 79-82 (2013) ("*2013 IP CTS Order*") (relying on evidence that hearing loss depends on a variety of factors, including not just "the audibility of speech" but also "auditory distortions and susceptibility to background noise" as well as "hearing loss in terms of the frequency spectrum, device noise and distortion, and other variables" (internal quotation marks omitted)), *vacated in part by Sorenson Commc'ns Inc. v. FCC*, 755 F.3d 702 (D.C. Cir. 2014).

[36] U.S. Food & Drug Admin., U.S. Dep't of Health & Human Servs., Medical Devices: *Benefits and Safety Issues*, https://www.fda.gov/medicaldevices/productsandmedicalprocedures/homehealthandconsumer/consumerproducts/hearingaids/ucm181477 htm (last visited Sept. 10, 2018) (emphasis added).

filters increases the volume of everything, it does little to solve the problems created by background sound. Whether amplification with sophisticated filters offers the same benefits as captioning in terms of reducing the cognitive load for individuals with hearing loss to understand and remember the content of communications is not yet known[37]—nor is it clear that sophisticated amplification options are available on a mass market, affordable basis.

Messaging services like RTT are also insufficient to deliver a functionally equivalent service to an individual with hearing impairments. They do not allow individuals the ability to communicate with their own voices and therefore cannot achieve the statutory mandate of functional equivalence. Moreover, RTT is not widely deployed, and is not yet required for wireline devices.[38] In addition, doctors, lawyers, and other professionals do not use (and may be unwilling to adopt) RTT, and many older Americans may not wish to have sensitive conversations concerning health or financial matters in text format. RTT thus raises privacy concerns that are avoided with IP CTS under the ADA and the Commission's mandatory minimum standards. Moreover, RTT and similar messaging services are often difficult for CaptionCall's user base, which is composed of people who are older and less familiar with solely text-based communications such as SMS "texting." Recent Gallup studies suggest that Americans aged 65 and older are much less likely to text than younger Americans.[39] The pace and accuracy of text-based services also depend on the ability of users to type on small keys on glass keyboards—a

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[37] *See supra* notes 21-26 and accompanying text.

[38] *Cf. In re Transition from TTY to Real-Time Text Technology*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 13,568 (2016).

[39] Frank Newport, *The New Era of Communications Among Americans*, Gallup (Nov. 10, 2014), https://news.gallup.com/poll/179288/new-era-communication-americans.aspx.

requirement that imposes an extra and potentially acute burden on Americans who may have disabilities that limit their physical ability to text.[40]

III. CaptionCall Shares the Commission's Concerns about the Sustainability of the TRS Fund, but the Increased Demand for IP CTS Has Been Organic and Beneficial, and Is Not Attributable to Waste, Fraud, or Abuse.

CaptionCall supports the Commission's goal of preventing waste, fraud, and abuse in the IP CTS program, and to make sure that this critical service remains available to eligible users. But the *Further Notice* leaps from the premise that demand for IP CTS is growing to the erroneous conclusion that a primary driver of the growth must be waste, fraud, or abuse. This assumption is problematic for two reasons. First, there is a much simpler explanation that has robust evidentiary support—namely, that there is a large and growing population of individuals diagnosed with hearing loss for whom IP CTS is often the only option that can deliver functional equivalence. Second, there is no evidentiary support for the Commission's assumption. The Commission has had an open proceeding for five years to develop a record of waste, fraud, and abuse in the IP CTS program. Thus far, however, the evidence simply is not there, suggesting that the proposals in the *Further Notice* are solutions in search of problems, and that a reviewing court might be left with "more questions than answers."[41]

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[40] In contrast, IP CTS enables users to process text at a reasonable pace, on a larger device. Moreover, a 2014 study conducted by the Pew Research Center found that only 18 percent of seniors would feel comfortable learning a new device such as a smartphone on their own. Aaron Smith, *Older Adults and Technology Use*, Pew Research Center (Apr. 3, 2014), http://www.pewinternet.org/2014/04/03/older-adults-and-technology-use/. Notably, CaptionCall supports all new users during installation with hands-on, in-person instruction on how to use the CaptionCall device (including with respect to technical issues, such as how to turn it on and off, how to set a default, as well as regulatory issues, such as restrictions on who may use captioning).

[41] *Sorenson Commc'ns, Inc. v. FCC*, 755 F.3d 702, 708 (D.C. Cir. 2014).

A. The Increase in IP CTS Usage Has Been Driven by a Growing Population of People Finally Getting the Technology They Need for Functional Equivalence.

Although the Commission acknowledges that IP CTS must be available for those individuals who need it,[42] the *Further Notice* indicates that reform is necessary to achieve this goal because of the exponential and "extraordinary" demand growth for IP CTS since 2011[43]—which stands in contrast to the either declining or relatively flat demand for other TRS during the same period.[44] CaptionCall appreciates the Commission's concern that this growth in demand has put pressure on the TRS Fund.[45] But the most logical *and* record-based explanation for the increased demand for IP CTS is that there is a growing number of individuals for whom this life-changing service is necessary to achieve effective communication by telephone. The *Further Notice* itself estimates that between 40 and 48 million Americans currently suffer from hearing loss.[46] Because

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[42] *See Further Notice* ¶ 1.

[43] *See Further Notice* ¶¶ 8, 42. The Commission notes that in 2018-19, IP CTS will represent "approximately 78 percent of the total minutes of TRS compensated by the TRS Fund and about 66 percent of total TRS Fund Payments to TRS providers." *Id.*

[44] It is unsurprising that VRS demand has not grown during this same period; the base for the service is stable and not growing. The declining demand for TTY is primarily due to the fact that it is an antiquated service: It is not full duplex, which means it is not possible to send and receive information at the same time. Likewise, the declining demand for state-based, analog CTS is unsurprising, given the increasing demand for IP CTS. The declining demand for IP Relay is at least in part attributable to the availability of mobile VRS as a substitute and in part attributable to efforts to combat concrete fraud in the program. *See Further Notice* ¶ 30 & n.102; *In re Purple Commc'ns, Inc.*, Notice of Apparent Liability for Forfeiture, 29 FCC Rcd 5491 (2014).

[45] For this reason, and consistent with prior filings, CaptionCall supports the Commission's proposal to expand the TRS Fund base to include intrastate revenues. *See Further Notice* ¶ 102; *see also* Joint Comments of Sorenson Communications, Inc. and CaptionCall, LLC on IDT Petition for Rulemaking Regarding Interstate Telecommunications Relay Service Fund Contribution, CG Docket No. 03-123 (Feb. 4, 2016).

[46] *Further Notice* ¶ 12 & n.39. Moreover, the Commission has been on notice that there could be as many as 40 million individuals with hearing loss—for many of whom captioning would be most likely to deliver functional equivalence—since 2005. *See* Petition for Rulemaking to Mandate Captioned Telephone Relay Service and Approve IP Captioned Telephone Relay Service, CG Docket No. 03-123, at 9-10 (Oct. 31, 2005) ("*2005 IP CTS Petition*") (describing that "[t]he number of Americans who can benefit from" CTS "is large and expanding,"; noting that while there were "31 million Americans with mild-to-profound hearing loss," that number is "expected to jump to 40 million in less than a generation"; and explaining that "captioned telephone appeals to a segment of people with hearing loss whose communications needs are not adequately met by existing [TRS]" because they are able to "use their residual hearing, spoken language" and "may not be comfortable with nor satisfied with using traditional TRS and may not

the growing population of people who are aging into hearing loss have never before had to learn American Sign Language, VRS is not a substitute.[47] It therefore should come as no surprise that the number of IP CTS users would grow every month,[48] or that this group of older individuals forms the core of IP CTS users.[49]

At the same time, screening for and diagnosis of hearing loss are becoming more common, resulting in better treatment for individuals. For example, more people are undergoing hearing screening during routine physical exams. A recent market survey suggests that "[t]he proportion reporting a hearing screening during a physical exam is higher at 23% among adults [in 2015], compared to 15% in [2012]."[50] Moreover, the Initial Preventive Physical Examination for the Medicare program, also known as the "Welcome to Medicare Preventive Visit" now "requires hearing loss screening with questioning or a questionnaire, and the Medicare Annual Wellness Visit requires assessment by either established screening questions, a questionnaire, or direct

have sign language skills"). It is thus hard to account for the Commission's description that demand growth has been surprising or extraordinary.

[47] Census figures from 2014 projected that the percentage of the U.S. population over 65 would be 15 percent in 2015 (approximately 55,000,000 people), rising to 21 percent (over 70,000,000 people) by 2030. U.S. Census Bureau, *2014 National Population Projections Tables*, Table 3 (May 9, 2017), https://www.census.gov/data/tables/2014/demo/popproj/2014-summary-tables.html. This population is experiencing hearing loss incident to aging: The percentage of individuals between the ages of 65 and 74 reporting "difficulty hearing" is 22 percent—a figure that increases to 62 percent for individuals who are 85 or older. *See* Abrams and Kihm, *supra* note 31, Figure 3.

[48] *See Further Notice* ¶ 125 & n.350 (recounting monthly growth of 6000 new users per month). **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION:** [redacted] **:END HIGHLY CONFIDENTIAL INFORMATION]]**

[49] *See supra* Part II.A.

[50] Harvey B. Abrams & Jan Kihm, *An Introduction to MarkeTrak IX: A New Baseline for the Hearing Aid Market*, Hearing Review (May 15, 2015), http://www hearingreview.com/2015/05/introduction-marketrak-ix-new-baseline-hearing-aid-market/.

observation."[51] The increased incidence of hearing screening also may be partly attributable to reduced stigma concerning hearing loss and the use of hearing aids; for example, one 2013 study found that the assignment of negative attributes to those who use hearing aids had declined significantly since the 1970s.[52]

Against this backdrop, the growth in demand for IP CTS should be understood as organic and desirable, because "[f]inally people with hearing loss are getting access to the phones they need."[53] Indeed, by CaptionCall's analysis, less than one percent of the 40-48 million Americans with hearing loss is currently using IP CTS, suggesting this remains an underserved community. And, critically, the growing population of individuals with hearing loss, by itself, strongly indicates that the increased usage of IP CTS is not attributable to waste, fraud, or abuse.

B. There Is No Record Evidence of Waste, Fraud, or Abuse in the IP CTS Program.

Notwithstanding the trends discussed above, the Commission professes "concern[] that a large portion of the recent growth in IP CTS may be attributable to perverse incentives for providers to market this service to individuals who do not need it."[54] Although CaptionCall appreciates the Commission's willingness to refresh the record to determine if waste, fraud, or

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[51] Kevin J. Contrera et al., *Hearing Loss Health Care for Older Adults*, 29 J. Am. Bd. Fam. Med. 394, 400 (2016), http://www.jabfm.org/content/29/3/394 full.pdf+html (internal quotation marks and footnotes omitted).

[52] EP Rauterkus & CV Palmer, *The Hearing Aid Effect in 2013*, 25 J. Am. Acad. Audiology 893 (2014). Even with these positive developments, however, "there continue to be considerable gaps in individuals seeking assistance[,] and many people with self-reported hearing difficulty are not evaluated or treated." *AAA Comments* at 3-4.

[53] Comments of Hearing Loss Association of America at 2, CG Docket Nos. 13-24, 03-123 (Feb. 26, 2013) ("2013 Comments of Hearing Loss Association of America").

[54] *Further Notice* ¶ 10 (expressing "concern[] that a large portion of the recent growth in IP CTS may be attributable to perverse incentives for providers to market this service to individuals who do not need it").

abuse has become a problem for the IP CTS program,[55] the record does not support the Commission's concern that ineligible consumers are using IP CTS. As numerous commenters have explained over the past five years, there is little or no record evidence of waste, fraud, or abuse in this program.[56]

The record matters because the Commission is not writing on a blank canvas. In 2013, when the Commission last adopted user eligibility rules for IP CTS aimed at deterring supposed IP CTS fraud, the D.C. Circuit found that they violated the APA because "the agency [had] offer[ed] no evidence suggesting there [was] fraud to deter."[57] The court also described the Commission's rules as "intended to defeat a bogeyman whose existence was never verified, *i.e.*, the fraudulent use of IP CTS technology."[58] The Commission should exercise greater care here.

There is also no evidence to support the Commission's suggestion that, due to improper incentives or relationships between providers and HHPs, HHPs are pressuring customers to request

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[55] *See Sorenson Commc'ns Inc. v. FCC*, 755 F.3d 702 (D.C. Cir. 2014) (finding that adoption of eligibility rules without going through notice-and-comment procedures violated APA).

[56] *See, e.g.*, Letter from Rebekah P. Goodheart, CaptionCall Counsel to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission (May 29, 2018); Letter from John T. Nakahata, Counsel to CaptionCall, to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission 5 (Apr. 24, 2017); *see also* Initial IP-CTS Survey Analysis by the Rehabilitation Engineering Research Center on Telecommunications Access, CG Docket No. 13-24, CG Docket No. 03-123 (Apr. 12, 2013) (describing that survey of 2014 special captioned telephone users does not support either fraud or misuse and that consumer education regarding usage rules could reduce what little wasteful fraud was found); Letter from Christopher J. Wright, Counsel to CaptionCall, LLC to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 03-123, 13-24, at 2 (Aug. 12, 2013); Reply Comments of Sorenson Communications, Inc. and CaptionCall, LLC, CG Docket Nos. 03-123, 13-24 at 8 (Mar. 12, 2013); Reply Comments of Ultratec, Inc., CG Docket Nos. 03-123, 13-24 at 8-10 (Mar. 12, 2013); 2013 Comments of Hearing Loss Association of America, at 1-2; *see also* Letter from Philip J. Macres, Counsel for TeleCommunications for the Deaf and Hard of Hearing, to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 03-123, 13-24, at 2 (June 20, 2013).

[57] *See Sorenson Commc'ns*, 755 F.3d at 707-08; *see also id.* at 708 ("[W]here is the evidence that IP CTS technology is being fraudulently used?").

[58] *Id.* at 710; *see also id.* at 708 (describing that no deference is accorded to an agency's predictive judgments where they are based on sheer speculation, rather than logic and evidence).

IP CTS.[59] Indeed, HHPs actually refer a very small proportion of their patients to providers of IP CTS. For example, in 2018, CaptionCall received, on average, less than one certification every month from HHPs who certified users. These numbers are all the more striking when one considers that most HHPs likely see multiple patients *every day*—and potentially 100 or more patients per month.[60]

The Commission's suspicion that individuals who do not need IP CTS are nonetheless using it is also significantly undermined by looking at the actual population of current IP CTS users. Over 90 percent of CaptionCall's users have at least one hearing aid and/or cochlear implant. Hearing aid users tend to report low levels of satisfaction when using the telephone—and many individuals who have been fitted with hearing aids, but ultimately did not purchase them, cite difficulty with the telephone as a primary reason they did not make the purchase.[61] The most logical inference is that CaptionCall's users generally have tried using the telephone with hearing aids, and have found that they need additional assistance. These are precisely the circumstances when an HHP, using his or her professional judgment, should inform an individual of other options, including IP CTS.

As discussed at greater length below, the concerns identified in the *Further Notice* regarding HHPs also ignore that HHPs are subject to extensive state regulation and are likewise governed by professional codes that prevent waste, fraud, and abuse.[62] Indeed, many of the

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[59] *Further Notice* ¶ 131 n.361.

[60] CaptionCall estimates that approximately 1 percent of HHP visits per month result in a certification for CaptionCall.

[61] *See supra* notes 31-32 and accompanying text.

[62] *See infra* notes 97-102 and accompanying text.

imagined practices described in the *Further Notice* are already unlawful or prohibited by the American Academy of Audiology and the National Board for Certification in Hearing Instrument Services. Yet the *Further Notice* does not request comment on whether these rules are ineffective—or are in any way different from, or weaker than, similar rules that apply to virtually every other type of medical provider.[63]

In light of the foregoing, the projection in the *Further Notice* that it would be possible to realize first year savings for the TRS Fund ranging from $14.2 to $24.8 million, with additional cumulative savings over time, by simply preventing new ineligible users from using IP CTS is *doubly* unfounded. First, it is unclear why or how the *Further Notice* projects savings based on an assumption that either "10 percent" or "20 percent" of "the IP CTS usage generated by new users results from registration of users who do not need IP CTS."[64] Both percentages are uncited and have no support in the record. Choosing these percentages thus would be entirely arbitrary even if the Commission were correct (and it is not) that there is *generally* a waste, fraud, and abuse problem in the IP CTS program.[65] Second, the last five years of experience suggest that the baseline assumption that there is systemic fraud or abuse lacks any foundation in the record. The objective evidence matches CaptionCall's experience: For predictable and demographically inevitable reasons, a growing number of people are experiencing hearing loss and seeking

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[63] *Motor Vehicles Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (an "agency must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made" (internal quotation marks omitted)); *Chamber of Commerce of the U.S.A. v. SEC*, 412 F.3d 133, 144 (D.C. Cir. 2005) (an agency must consider alternatives that are "neither frivolous nor out of bounds").

[64] *Further Notice* ¶ 137.

[65] *Cf. Sorenson Commc'ns*, 755 F.3d at 707-08 (finding it "difficult to pinpoint the exact genesis" of Commission's rule requiring users to pay at least $75 on equipment to be eligible to use IP CTS and finding that the rule violated the APA where it was unclear, among other things, "how . . . the Commission arrive[d] at the target price of $75").

assistance from HHPs—who, in turn, are using their professional judgment to refer individuals that need IP CTS.

IV. The Commission Must Ensure That Any Eligibility Framework Does Not Impede the Goal of Ensuring That People with Hearing Loss Can Achieve Functional Equivalence as Required by the ADA.

The Commission seeks comment on a variety of proposals regarding user eligibility purportedly to reduce waste, fraud, and abuse—such as restrictions on third-party eligibility determinations,[66] as well as broad and narrow devolutions that would send administration of, and/or oversight of user eligibility for, IP CTS to the states. CaptionCall is concerned that some of the Commission's proposals involve excessive costs and could impose unnecessary burdens or erect unnecessary barriers for eligible users. Reforms that impede access just to reduce costs to the TRS Fund would be contrary to the statutory directive to make these services "available" to all individuals with hearing impairments "in the most efficient manner."[67] CaptionCall does not dispute that the Commission may seek both to expand availability and to reduce costs to preserve long-term sustainability of the TRS Fund.[68] But, consistent with the ADA, the Commission's "primary objective" must be to ensure that individuals with speech and hearing impairments have access to effective communications by telephone;[69] that is an essential federal civil right. As the American Academy of Audiology has explained, the availability of IP CTS has had "a powerful and positive impact on the daily lives of many Americans."[70] The Commission may not prioritize

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66 *See Further Notice* ¶¶ 117-122, 129-134.

67 47 U.S.C. § 225(b)(1).

68 *See Sorenson Commc'ns, LLC v. FCC*, 897 F.3d 214, 227-28 (D.C. Cir. 2018).

69 *Id.*

70 *AAA Comments* at 1.

cost savings or efficiency except when choosing between two equally effective alternatives of providing functional equivalence, nor may it adopt eligibility screens that are specifically intended to deter use of IP CTS by individuals who need it.[71] Doing so would be "contrary to the spirt of the Communications Act," as amended by the ADA.[72]

A. The Commission Should Require That IP CTS Providers Accept Only Third-Party Certifications That Are in Writing, Signed under Penalty of Perjury, and Include Certain Attestations about the Individual's Need for the Service.

The Commission seeks comment on potential third-party certification requirements. Although not required by the Commission to do so, CaptionCall currently provides service to new users primarily based on third-party certifications, signed by an HHP, under penalty of perjury.[73] CaptionCall's existing certification form requires the HHP to make numerous attestations

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[71] *Cf.* Comments of Sorenson Communications, LLC Regarding Part III and Section IV.C-E and G-H of the Further Notice of Proposed Rulemaking, CG Docket Nos. 10-51 & 03-123, Ex. A, (May 30, 2017) (Samuel Bagenstos, *The Proper Interpretation of 'In the Most Efficient Manner' in Title IV of the Americans with Disabilities Act* (2017)); Declaration of Samuel Bagenstos, CG Docket Nos. 13-24 & 03-123 (Sept. 23, 2013). Even if the Commission were permitted to balance expanding availability and reducing costs under Section 225—which it is not—it would still be prohibited from "focusing solely" on reducing costs while "ignor[ing]" whether its rules interfere with the availability of the service; it would be required to demonstrate why the objectives "conflict" in this context, or why one "outweighs" the other. *Cf. Qwest Commc'ns Int'l, Inc. v. FCC*, 398 F.3d 1222, 1234 (10th Cir. 2005) (invalidating interpretation of "reasonably comparable" under Section 254 for similar shortcomings). Many of the Commission's proposals also fail under a traditional APA or cost-benefit analysis: Given the lack of evidence that there is fraud to prevent, the Commission should not adopt rules that will harm consumers through the erection of unnecessary barriers to the service or that impose compliance costs on providers that will trade off with investments in innovation and competition. *See, e.g.*, Exec. Order 13563, *Improving Regulation and Regulatory Review*, 76 Fed. Reg. 3821 (Jan. 18, 2011); *cf. In re Establishment of the Office of Economics and Analytics*, Order, 33 FCC Rcd 1539 (2018).

[72] *AAA Comments* at 4.

[73] In 2013, the Commission initially adopted an interim requirement that, for certain users' IP CTS minutes to be compensable from the TRS Fund, the provider had to obtain an independent, third-party certification evidencing the user's need for the service. *2013 IP CTS Order*, 28 FCC Rcd at 13,432 ¶ 24. The Commission ultimately eliminated this method of establishing user eligibility, preferring to require that, with few exceptions, all eligible users pay at least $75 for equipment. *See id.* at 13,443-45 ¶¶ 49-54. The D.C. Circuit invalidated the $75 requirement, finding, among other things, that the Commission had not established that there was fraud in the program to combat. *Sorenson Commc'ns*, 755 F.3d at 708. Since that time, there have been no Commission-level restrictions on user eligibility, yet CaptionCall continues to assess user eligibility based on third-party certifications or a customer's purchasing an IP CTS phone for $75 or more.

regarding the HHP and the user to ensure that the service is being provided only to users who genuinely need it. The form requires the HHP to attest:

- I certify, under penalty of perjury, that I am a hearing-care or healthcare professional and am qualified to diagnose hearing loss.
- I certify that I have determined that the patient referenced above has a hearing loss that makes it difficult to communicate effectively by telephone, and requires the use of captioned telephone service to communicate by telephone in a manner that is functionally equivalent to a fully hearing person.
- I certify that both I and the patient understand that the captioning service is provided by a live Captioning Agent and that this service is funded through a federal program for the hearing impaired.
- I certify that I do not have any business, family or social relationship with any employee of Sorenson Communications or CaptionCall.
- I certify that the patient referenced above has explicitly authorized me to request that CaptionCall contact him or her regarding CaptionCall captioning services using the contact information provided above.

If CaptionCall receives a certification that does not include the above attestations—or with amendments to any of the attestations—CaptionCall does not accept the certification.

1. CaptionCall Generally Supports the Commission's Requiring All IP CTS Providers to Obtain Third-Party Certifications from Medical Professionals That Include Certain, Specific Attestations.

CaptionCall supports the Commission's proposal to adopt a third-party certification framework, in many respects.[74] If adopted, this framework should provide more than sufficient safeguards to ensure only eligible consumers use the service.

[74] *See Further Notice* ¶ 129.

First, CaptionCall generally supports the Commission's proposal that certifications should come from only certain qualified types of health providers.[75] But the list of such providers in the *Further Notice* is underinclusive. The Commission included many additional provider types in its 2013 interim rules, and the *Further Notice* does not recount any evidence, or basis for believing, that these providers (*e.g.*, community-based service providers, vocational rehabilitation counselors, occupational therapists, social workers, educators, speech pathologists, nurses, and so forth) are either less able to identify individuals who need captioning service or more susceptible to improper incentives. The Commission should not exclude these providers without a basis for doing so. At a minimum, however, the Commission should include as qualified providers gerontologists and geriatricians, as well as general and family practitioner doctors, pediatricians, registered nurses, and case workers that conduct hearing evaluations as part of their practices.

Second, CaptionCall supports modifying its certification to include the following HHP attestation: "I have conducted an evaluation of the individual in accordance with applicable professional standards," and, "in my opinion, the applicant has a hearing loss that necessitates the use of IP CTS to achieve effective telephone communication."[76] CaptionCall believes that adding this attestation would cure any perceived deficiency that its current certification form implies—but does not specifically require an affirmation—that the certifying HHP "has personally examined

[75] *See Further Notice* ¶ 130 (listing "physicians specializing in otolaryngology, audiologists, or other state certified or licensed hearing health professionals qualified to evaluate an individual's hearing loss in accordance with applicable professional standards" as the only providers whose certifications should support compensability). CaptionCall understands the Commission's reference to "certified or licensed hearing health professionals" to include qualified Hearing Instrument Specialists ("HIS").

[76] *See Further Notice* ¶ 133.

the individual in order to assess that person's ability to communicate by telephone" and need for IP CTS.[77]

The Commission should not, however, require an HHP to attest that he or she has conducted an assessment "in accordance with . . . the Commission's rules."[78] This requirement would place an unreasonable and unnecessary burden on HHPs. As reflected in these comments, CaptionCall is not opposed to including specific factual attestations in its certification form that reflect compliance with the Commission's IP CTS rules. But any applicable rules should be included on the form, as it is unrealistic to expect an HHP—or even the most experienced communications lawyer—to have familiarity with the entirety of Title 47 of the Code of Federal Regulations ("CFR"). Thus, requiring HHPs to attest generally to compliance with the "Commission's rules" risks deterring HHPs from providing certifications for eligible users. There is also no reason to think that requiring an HHP to attest *both* to facts that establish compliance with the IP CTS rules *and* to compliance generally with the "Commission's rules" would prevent any certifications that would not also be prevented by requiring only the specific factual attestations.

Third, CaptionCall is not opposed to requiring the referring HHP to certify that, for any service that involves the use of CAs, he or she has "explained to the consumer that . . . the captions used for IP CTS may be generated by a CA who listens to the other party on the line and provides

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[77] *Further Notice* ¶ 119 n.334. CaptionCall reiterates that this perceived deficiency is a red herring, because an HHP that has not examined a patient, personally or by a member of his or her staff, would not risk his or her professional career by offering a potentially false certification. *See* Letter from John T. Nakahata, Counsel to CaptionCall, LLC to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission at 1-2 (Jan. 12, 2018) ("*Sorenson 1-12-18 Ex Parte*").

[78] *Further Notice* ¶ 133.

captions received by the IP CTS subscriber."[79] CaptionCall likewise is willing to include an attestation that the HHP has explained the funding mechanism for IP CTS to the user, but recommends modifying the attestation as follows: "I certify that I have explained to the consumer that there is a per-minute cost to provide captioning on each IP CTS call, **but that the consumer will not be charged for receiving captions during phone calls, because the service ~~which~~** is funded through a federal program."[80] This language will help clarify for new users how the TRS Fund is funded.

2. Adopting the Certification Requirements Described above Will Build on Existing Federal and State Law and HHP Codes, and Would Prevent Any Waste, Fraud, and Abuse in the Program.

It would be premature to adopt other restrictions beyond the use of third-party certifications to establish user eligibility. Before adopting additional burdens and new potentially unnecessary regulations, the Commission should first adopt the third-party certification requirement discussed above, and then assess the efficacy of such certifications. There is every reason to believe that such certifications will be a sufficient check to ensure only consumers who need the service use IP CTS. Indeed, the Commission has found that professional certifications are sufficient for determining eligibility for the Deaf-Blind program,[81] and the *Further Notice* cites no evidence or

[79] *Further Notice* ¶ 133 & n.366.

[80] *Further Notice* ¶ 133.

[81] *See Further Notice* ¶ 128 n.355 (noting that Commission relies on Perkins School for the Blind and Helen Keller National Center to administer NDBEDP program and conduct consumer assessments on behalf of several states); *see also In re Implementation of the Twenty-First Century Communications and Video Accessibility Act of 2010, Section 105, Relay Services for Deaf-Blind Individuals*, Report and Order, 31 FCC Rcd 9178 9202-04 ¶¶ 58-63 (2016) ("*NDBEDP Order*") (adopting requirement from pilot program that NDBEDP applicants must "provide verification of their disability either by obtaining an attestation from a professional with direct knowledge of their deaf-blindness" and providing examples of such professionals including "*e.g.*, community-based service provider[s], vision or hearing related professional[s], vocational rehabilitation counselor[s], educator[s], and medical or health professional[s]").

basis for concluding that professionals are reliable to certify eligibility for one program but not another. Moreover, there is no reason for the Commission to believe that an HHP would risk violating his or her ethical requirements, as well as federal and state law, and potentially losing his or her license, by certifying under penalty of perjury that a patient needs captioning service, when in fact the patient does not.[82] It is thus difficult to understand the concerns expressed in the *Further Notice* "about the difficulties associated with relying on [HHPs to serve a] gatekeeping function."[83] These concerns are misplaced for a variety of reasons.

As a threshold matter, the Commission's 2013 IP CTS rules, as reinforced by the Commission's recently adopted rules, already address many, if not all, of the concerns identified in the *Further Notice* regarding improper practices by HHPs and IP CTS providers. The Commission's existing IP CTS rules already mandate that:

- IP CTS providers cannot provide benefits or incentives to certifying HHPs in exchange for referrals or installs.[84]
- IP CTS providers cannot engage in any joint marketing arrangements with HHPs.[85]
- IP CTS providers must collect and retain self-certifications for new users as to their need for IP CTS.[86]

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[82] *See Sorenson 1-12-18 Ex Parte* at 1-2.

[83] *Further Notice* ¶ 129. The Commission appears to believe that HHPs "may be subject to the enticements of free phones for their clients and other marketing promotions that can interfere with their impartial judgment about a client's eligibility." *Id.* The Commission also suggests that certain HHP practices may "minimize[] the consumer's role in initiating the request for the device and associated services, and might even result in the client feeling pressure from his [or her] [HHP]." *Further Notice* ¶ 131 n.361. As discussed herein, these concerns are not based on record evidence and are addressed by numerous federal and state requirements, as well as professional codes.

[84] 47 C.F.R. § 64.604(c)(8)(ii).

[85] 47 C.F.R. § 64.604(c)(8)(iii).

[86] 47 C.F.R. § 64.604(c)(9)(i)-(iii), (x); *id.* § 64.604(c)(11)(ii).

- IP CTS equipment must have a label warning against unauthorized use.[87]
- IP CTS providers' devices must feature decoupled volume control and caption settings.[88]
- IP CTS providers' websites, advertising, and educational information must contain notifications regarding appropriate usage of IP CTS.[89]
- IP CTS providers are subject to a prospective requirement not to engage in certain practices based on the concern that they could result in fraudulent usage.[90]
- IP CTS providers are audited in connection with their reimbursement from the TRS Fund—and CaptionCall's audit results confirm that CaptionCall's compliance practices are consistent with the Commission's rules.[91]

The Commission should not adopt any new rules until it has had a chance to evaluate whether its most recent rules have had the desired effect of deterring waste, fraud, and abuse.[92]

In any event, the Commission's apparent suspicions about the professionalism of HHPs is entirely unfounded. As the American Academy of Audiology explains, its professionals are doctoral-level health care professionals who are specifically trained to identify, manage, and treat hearing disorders.[93] "[A]s experts in hearing loss and communication disorders, . . . audiologists are critical to ensuring access to IP CTS";[94] indeed, "audiologists play a crucial role in ensuring

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[87] 47 C.F.R. § 64.604(c)(11)(iii).

[88] *Further Notice* ¶¶ 39-40.

[89] *Further Notice* ¶¶ 41-43.

[90] *Further Notice* ¶¶ 44-47.

[91] 47 C.F.R. § 64.604(c)(5)(D).

[92] As described above, CaptionCall does not agree that the Commission should treat increasing demand for the service as a proxy for the incidence of waste, fraud, and abuse in the program. But even if the Commission were to continue to rely on this reasoning—which it should not—it still should wait to see if the rules adopted in the *Report and Order* have any dampening effect on demand.

[93] *AAA Comments* at 2.

[94] *AAA Comments* at 3.

appropriate access to a range of hearing and communications solutions,"[95] and are committed to finding ways to ensure that IP CTS is used appropriately and based on need. It is therefore essential that the Commission have the appropriate background understanding of HHPs' "professional and ethical obligations that are required by state licensure and a code of ethics prescribed by membership in a national organization."[96]

Specifically, under state law and ethical codes, audiologists and hearing instrument specialists are licensed medical providers who are bound both to market their services accurately and to refer patients only as necessary.[97] The 12,000 audiologists who are members of the American Academy of Audiology are bound by the organization's code of ethics, which prohibits making public statements about products that are false, misleading, or deceptive.[98] Likewise, the National Board for Certification in Hearing Instrument Scientists' code of ethics requires practitioners to avoid any false, misleading, deceptive, or unfair advertising, including any

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[95] *AAA Comments* at 4.

[96] *AAA Comments* at 5. The AAA also raises valid concerns about the difficulty of the Commission's prescribing "functional assessments."

[97] With respect to marketing, for example, Florida regulations provide that HHPs may be subject to disciplinary action for "[a]dvertising goods or services in a manner which is fraudulent, false, deceptive, or misleading in form or content." Fla. Stat. § 484.056(1)(f) (governing conduct of HIS); Fla. Stat. § 468.1295(1)(e) (governing conduct of audiologists). Florida regulations likewise prohibit HHPs from "[u]sing, or causing or promoting the use of, any advertising matter, promotional literature, testimonial, guarantee, warranty, label, brand, insignia, or other representation, however disseminated or published, which is misleading, deceiving, or untruthful." Fla. Stat. § 484.056(1)(j) (governing conduct of HIS); Fla. Stat. § 468.1295(1)(i) (governing conduct of audiologists). Other states take a similar approach. *See, e.g.*, N.Y. Comp. Codes R. & Regs. tit. 8 § 29.1(b)(12)(i) (prohibiting audiologists from engaging in advertising that is, among other things, false, fraudulent, deceptive, or misleading); N.Y. Gen. Bus. Law § 799 (prohibiting hearing aid dispensers from engaging in misleading advertising); Cal. Bus. & Prof. Code § 2533(i) (prohibiting the "use, or causing the use, of any advertising or promotional literature in a manner that has the capacity or tendency to mislead or deceive purchasers or prospective purchasers").

[98] Code of Ethics, American Academy of Audiology Code of Ethics (rev. Feb. 2018), https://www.audiology.org/sites/default/files/about/membership/documents/Code%20of%20Ethics%20with%20procedures-REV%202018_0216.pdf.

advertising that is "misleading due to the omission of necessary material information" and advertising that is otherwise deceiving.[99]

State law and professional and ethical codes similarly limit when an HHP may refer a patient to another provider for services or treatment.[100] Moreover, under the American Academy of Audiology's code of ethics, audiologists are prohibited from giving or accepting benefits or items of value for receiving or making referrals.[101] And, under the code of ethics adopted by their National Board for Certification, hearing instrument specialists must avoid conflicts of interest that interfere with their professional judgment.[102]

In short, the *Further Notice* fails to consider whether the Commission's existing rules, when combined with state laws and regulations, as well as HHP professional codes, are adequate to prevent any wasteful, fraudulent, or abusive use of IP CTS. And in fact, these laws, requirements, and rules already prohibit many of the purportedly illegitimate practices that the Commission fears are commonplace with respect to IP CTS marketing, referrals, and provider-

[99] Code of Ethics, National Board for Certification in Hearing Instrument Services (rev. May 2013), http://www nbc-his.com/docs/default-source/default-document-library/code-of-ethics.pdf?sfvrsn=4.

[100] For instance, Florida law prohibits any HHP from "[e]xercising influence on a client in such a manner as to exploit the client for financial gain of the [HHP] or a third party." Fla. Stat. § 484.056(1)(v) (governing conduct of HIS). Here too, other states impose similar obligations. *See* N.Y. Comp. Codes R. & Regs. tit. 8 § 29.1(b)(3) (prohibiting an audiologist from "directly or indirectly offering, giving, soliciting, or receiving or agreeing to receive, any fee or other consideration to or from a third party for the referral of a patient or client or in connection with the performance of professional service") N.Y. Gen. Bus. Law § 799(2)(r) (prohibiting hearing aid dispensers from "exerting influence on a client in such a manner as to exploit the client for financial gain for the registrant or for a third party").

[101] Code of Ethics, American Academy of Audiology Code of Ethics (rev. Feb. 2018), https://www.audiology.org/sites/default/files/about/membership/documents/Code%20of%20Ethics%20with%20procedures-REV%202018_0216.pdf.

[102] Code of Ethics, National Board for Certification in Hearing Instrument Services (rev. May 2013), http://www nbc-his.com/docs/default-source/default-document-library/code-of-ethics.pdf?sfvrsn=4.

HHP relationships.[103] It is thus unclear what benefits the Commission could achieve through the adoption of additional eligibility restrictions. But it is clear that these restrictions could prevent eligible users from accessing the service and impose excessive costs on providers.

B. The Commission's Other Proposals Regarding Third-Party Eligibility Determinations Risk Depriving Eligible Individuals of Access to Functional Equivalence or Are Otherwise Unlawful.

The Commission seeks comment on a number of additional proposals that would limit the circumstances when a third-party certification could be used to establish an individual's eligibility for IP CTS. In addition to being unnecessary, these proposals are likely to be harmful and/or are contrary to law.

First, the Commission seeks comment on a rule to "prohibit an IP CTS provider from accepting a certification from any professional that has a business, family, or social relationship with the IP CTS provider or with any officer, director, partner, employee, agent, subcontractor, sponsoring organization, or affiliated entity."[104] Any concern about potentially problematic relationships between HHPs and providers can be addressed via a requirement that HHPs attest that they do not have a "business, family, or social" relationship with the IP CTS provider when making a certification. As noted above, CaptionCall's current certification form requires a similar version of this attestation. By addressing this concern through a certification requirement, the Commission would impose an obligation on each HHP, consistent with his or her ethical and other

[103] CaptionCall is not aware of any evidence suggesting that patients feel pressured by HHPs into using IP CTS. *See Further Notice* ¶ 131 n.361. The Commission itself cites only "[a]ncedotal evidence." *See id.* Absent evidence, to claim that savings can be realized by preventing HHPs from exerting pressure on patients would be to rely on "one unsubstantiated conclusion heaped on top of another." *Sorenson Commc'ns*, 755 F.3d at 708.

[104] *Further Notice* ¶ 131.

legal obligations, to determine whether any relationships create a conflict of interest that precludes attesting to the user's eligibility.[105]

The Commission should not, however, adopt a substantive prohibition against an HHP's providing a certification whenever such a relationship exists. Addressing this issue through a substantive requirement (as opposed to via a certification) would raise serious constitutional vagueness concerns.[106] As CaptionCall has previously explained, each relationship—business, family, and social—is undefined and fails to afford adequate notice as to when certifications must be rejected. It is impossible to tell what conduct between two parties, other than the existence of a written or unwritten contract, establishes a "business relationship."[107] "Family relationships" could be narrowly construed to include only current, immediate family (spouse, children, siblings, and parents), extended family (multiple generations and/or degrees of grandparents, uncles/aunts, and cousins), or former family.[108] And the category of "social relationships" is even more ill-defined:

> What if a hearing-health professional and employee of an IP CTS provider are members of the same social organization? Or go to the same church? Or were once friends but have not spoken in some

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[105] *AAA Comments* at 4-5 ("The Academy agrees that the potential for a business, family, or social relationship between an IP CTS provider and the audiologist could be a cause of concern for the consumer. However, it is our experience that IP CTS providers already require the audiologist to attest to these important distinctions when authorizing a captioned phone for a patient. To this end, the Academy is interested in working with the FCC to fully explain . . . the professional and ethical obligations that are required by state licensure and a code of ethics prescribed by membership in a national organization." (footnote omitted)).

[106] Letter John T. Nakahata, Counsel to CaptionCall, LLC to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission at 4 (Dec. 27, 2013) ("*CaptionCall 12-27-13 Ex Parte*") (arguing that similar interim rules "do not give providers enough operational guidance regarding who must be excluded from certifying").

[107] *See CaptionCall 12-27-13 Ex Parte* at 5 ("[I]t is difficult to list examples of a 'business relationship' that [are] not founded in a written or unwritten, express or implied, contract. It surely is not meant to be as broad as membership in the same local Chamber of Commerce or professional association, or making an educational visit to an audiologist.").

[108] *See CaptionCall 12-27-13 Ex Parte* at 6.

> number of months? Or have spoken in passing at an industry conference? Or dated—perhaps only once or twice or perhaps "seriously?" And when is a "social relationship" deemed to be over and thus no longer cognizable for the purposes of the certification rule.[109]

These ambiguities are heightened given the expansive application of the rule to "employee[s]" and "agent[s]"—terms that are unlikely to be helpful to HHPs or IP CTS provider field representatives when evaluating whether a particular certification is appropriate.[110] Absent more precision, the rule is susceptible to arbitrary or discriminatory enforcement, and thus is proscribed by the Fifth Amendment's Due Process guarantee.

Second, the Commission proposes to prohibit providers "from facilitating or otherwise playing a role in the acquisition of professional certifications by arranging, sponsoring, hosting, conducting, or promoting seminars, conferences, meetings, or other activities in community centers, nursing homes, apartment buildings, or any other location where [HHPs] offer free hearing screenings"—which is intended to have the effect of prohibiting "soliciting, facilitating, or collecting user certifications directly from [HHPs]."[111] The scope of this rule is not clear, but it raises significant First Amendment concerns and lacks any foundation in the record.

Insofar as this prohibition would prevent HHPs from "arranging, sponsoring, hosting, conducting, or promoting seminars, conferences, meetings, or other activities" in certain locations, it triggers heightened scrutiny under the First Amendment. That is so because the proposed rule

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[109] *See CaptionCall 12-27-13 Ex Parte* at 6.

[110] *See FCC v. Fox Television Stations, Inc.*, 567 U.S. 239, 253 (2012) ("[T]he void for vagueness doctrine addresses at least two connected but discrete due process concerns: first, that regulated parties should know what is required of them so they may act accordingly; second, precision and guidance are necessary so that those enforcing the law do not act in an arbitrary or discriminatory manner.").

[111] *Further Notice* ¶ 131.

would disfavor speech with a particular content (*i.e.*, about IP CTS), by specific speakers (*i.e.*, IP CTS providers).[112] As the Supreme Court has explained, "[a] consumer's concern for the free flow of commercial speech often may be far keener than his concern for urgent political dialogue"—a "reality [that] has great relevance in the fields of medicine and public health, where information can save lives."[113] In practice, the proposal would intervene directly in the marketplace of ideas, skewing patient choices by restricting CaptionCall's ability to reach them with truthful, educational, and relevant information about a lawful service that may meet their disability-related needs. This proposal would also deprive health providers of information about a lawful service that may be appropriate for their practices.[114] Unless there is concrete evidence that certifications obtained at such events are uniquely likely to be fraudulent or unnecessary, the proposal would fail First Amendment scrutiny.[115]

Insofar as this proposal is intended to prevent IP CTS providers from "soliciting, facilitating, or collecting user certifications directly from [HHPs]," it also could be construed to prohibit providers from receiving certifications directly from HHPs. But there is no record evidence that this practice results in any harm. The *Further Notice* does not cite evidence or

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[112] *Sorrell v. IMS Health Inc.*, 564 U.S. 552, 564-65 (2011).

[113] *Sorrell*, 546 U.S. at 566 (internal quotation marks omitted).

[114] The proposal would also face exacting scrutiny because it would burden IP CTS providers' right of association. As the Supreme Court has made clear, "the ability of like-minded individuals to associate for the purpose of expressing commonly held views may not be curtailed." *Knox v. Serv. Employees Int'l Union, Local 1000*, 567 U.S. 298, 309 (2012). Specifically, burdens on association ordinarily must survive what the Supreme Court has termed "exacting scrutiny." *Janus v. Am. Fed'n of State, County, & Mun. Emps., Council 31*, 138 S. Ct. 2448, 2465 (2018).

[115] Such evidence would be necessary, but not sufficient to survive First Amendment scrutiny. Specifically, under even the less exacting standard of *Central Hudson Gas & Electric Corp. v. Public Service Commission*, 447 U.S. 557 (1980), this evidence might indicate that the challenged regulation advances the Commission's interest in preventing waste, fraud, and abuse "in a direct and material way," but the Commission would also have the burden of establishing that the "extent of the restriction on protected speech is in reasonable proportion to the interests served." *Edenfield v. Fane*, 507 U.S. 761, 767 (1993).

suggest that direct HHP submissions of certifications to providers (as opposed to requiring HHPs to provide certifications to new users, who in turn must provide the certification to the provider) somehow deprives patients of control or input over their care, or otherwise encourages fraudulent or unnecessary certifications. Indeed, as recounted above, the submission of a certification on behalf of a patient (who, in CaptionCall's case, must have expressly authorized the submission) is only the first of many steps that must be taken before the patient uses captioning.[116]

Third, the Commission should not require HHPs to determine and certify that a user needs IP CTS for *all* of his or her calls before certifying that the user is eligible for IP CTS.[117] Instead, it is critical that an HHP must be permitted to certify an individual who needs captions *even for just some calls or some portions of calls*. That is so because it is not possible for an HHP to certify an individual on a call-by-call basis. But if an individual cannot achieve functionally equivalent telephone communications without captions when speaking to her granddaughter, or her doctor, or her executive assistant, or her social worker, or her psychiatrist, then that individual has a statutory right to access the service and should be so certified.[118]

Fourth, there is no reason for the Commission to require IP CTS providers to retain third-party certifications for 10 years.[119] The *Further Notice* does not explain how this retention

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[116] Moreover, the fact that HHPs are increasingly using software to provide certifications of patients directly to IP CTS providers reflects a general trend over the last decade toward greater use of "e-prescriptions"—which generally has been lauded as a positive development both for reducing waste and fraud, on the one hand, and preventing delay and danger for patients, on the other. Indeed, three states—Maine, New York, and Minnesota—have mandated the use of e-prescriptions for opioids. *See* 2017 National Progress Report 6-8, Surescripts, https://surescripts.com/news-center/national-progress-report-2017/.

[117] *See Further Notice* ¶ 132.

[118] As discussed at greater length below, CaptionCall agrees that individuals also should receive appropriate instruction at installation about when captions may be used and how captions can be turned on or off.

[119] *Further Notice* ¶ 134.

requirement would "assist with enforcement of these rules." For example, the Commission points to no instances where its enforcement efforts were hampered by its inability to access records covering the relevant time period. Nor does the Commission explain why such a lengthy retention period is necessary for providers who are routinely audited in connection with their claims for compensation. This requirement also would double the retention period that currently exists,[120] which was adopted to allow "the Commission or law enforcement agencies to investigate violations of the Commission's rules and orders or civil or criminal statutes."[121] Moreover, because the 10-year retention period would run from "termination" of the service, and not from the last claim for reimbursement associated with the customer, it also unreasonably extends beyond the False Claims Act's statute of limitations, which allows a civil action "in no event more than 10 years after the date on which the violation is committed."[122]

[120] 47 C.F.R. § 64.604(c)(5)(iii)(D)(7).

[121] *See In re Structure and Practice of the Video Relay Service Program*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 5545, 5585 ¶ 87 (2011) ("*VRS Call Practices R&O*"); *see also id.* ("Because the time required to complete comprehensive reviews and possible investigations into the operations of VRS providers may be significant, we believe it is reasonable to require retention of these records for a period of five years."). CaptionCall also notes that the retention period for participants in the Lifeline program is 3 years. 47 C.F.R. § 54.417. And while the Commission adopted a 10-year retention period in connection with the Connect America Fund, *see In re Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17,663, 17,864 ¶ 620 (2011), the longer retention period was more appropriate in that context, given the long-term, capital-intensive nature of the buildout of broadband networks, which the fund subsidizes. CaptionCall also notes that the retention period in that context runs from the "receipt of the final disbursement of" funds, *id.* ¶ 478, which is more consistent with the False Claims Act than the rule proposed here, running from termination of service (which could occur substantially after the final payment from the TRS Fund."), *see Further Notice* ¶ 134.

[122] 31 U.S.C. § 3731(b)(2).

C. The Commission Cannot and Should Not Engage in a Devolution of Authority over IP CTS Funding and Administration (Including User Eligibility and Provider Certification Determinations) to the States.

The Commission seeks comment on allowing or requiring states to "take a more active role in the administration of IP CTS"[123] and, in particular, in IP CTS funding, provider certifications, and user eligibility determinations.[124] CaptionCall agrees that state programs should continue to be an option for new users to be certified as eligible to receive IP CTS, but does not support any framework that would require or allow states to become the *only* means for individuals with hearing loss to be certified as eligible for the service[125]—and also opposes devolution of other aspects of IP CTS administration to the states. Indeed, such devolution not only would contradict the governing statute and decades of Commission precedent but would also result in huge costs and inefficiencies that are not offset by any identifiable benefits. The Kansas Corporation Commission, for example, notes that pursuing devolution, could result in "different [administration] . . . in every state, leading to confusion," and describes that it would be necessary to adopt an "implementation timeframe of at least four years," before states assume administration of the program.[126]

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[123] *Further Notice* ¶ 111; *see also id.* ¶¶ 111-113.

[124] *See Further Notice* ¶¶ 114-116, 123-128.

[125] *See Infra* Part IV.C.

[126] Comments of the Kansas Corporation Commission Regarding the IP CTS Portion of the TRS Program, CG Docket Nos. 13-24, 03-123, at 2, 7-8 (Sept. 11, 2018); *see also* Comments of the Nebraska Public Service Commission, CG Docket Nos. 13-24, 03-123, at 2-4 (Sept. 14, 2018) (noting that states would need a transition period of at least five years); *cf.* Comments by the Colorado Public Utilities Commission, CG Docket Nos. 13-24, 03-123, at 6-7 ("[T]he COPUC cannot meaningfully and comprehensively comment on this proposal until states receive state-specific data and information necessary to determine what state-level administration could possibly look like. . . . The potential framework around such administration is also unclear and questions remain as to whether states would certify IP CTS providers, have multiple providers of IP CTS, or need to seek state law changes to administer such programs." (footnote omitted)).

1. Mandated Devolution of Administration over IP CTS, Which Is an Interstate Information Service, Is Not Permissible under Section 225 and Contrary to Commission Precedent.

A threshold problem with devolving administration over IP CTS to the states is that Section 225(c) and (f) are limited to authorizing state programs to regulate "intrastate" TRS. IP CTS is an inherently *interstate* service, carried over the internet. The Commission has long recognized that such traffic is not susceptible to jurisdictional separations, because of the "inherent capability of IP-based services to enable subscribers to utilize multiple service features that access different websites or IP addresses during the same communication session and to perform different types of communications simultaneously, none of which the provider has a means to separately track or record."[127] Moreover, even assuming that *some* IP CTS calls could be classified as jurisdictionally intrastate—*i.e.*, where the "end-to-end voice communication between the calling party and the called party . . . uses the same ten-digit telephone number as ordinary voice traffic and is routed via . . . interconnected VoIP"[128]—IP CTS is still an "information service," and devolution to the states would be contrary to the longstanding federal policy of uniform regulation of information services.[129] As Chairman Pai stated only recently, "A patchwork quilt of 50 state laws harms investment and innovation in advanced communications services. That's why federal law for

[127] *In re Vonage Order Holdings Corp.*, Memorandum Opinion and Order, 19 FCC Rcd 22,404, 22,419-21 ¶ 25 (2004) (*"Vonage II")*.

[128] *See Further Notice* ¶ 110.

[129] *See, e.g.*, *In re Restoring Internet Freedom*, Declaratory Ruling, Report and Order, and Order, 33 FCC Rcd 311, 431 ¶¶ 201-202 (2018) ("*RIF Order*") (preemption is available to promote longstanding federal policy of nonregulation of information services by states); *Charter Advanced Servs. (MN), LLC v. Lange*, 259 F. Supp. 3d 980 (D. Minn. 2017) (interconnected VoIP is an "information service"), *aff'd*, No. 17-2290, --- F.3d ---, 2018 WL 4260322 (8th Cir. Sept. 7, 2018). This would be especially problematic with respect to the Commission's proposal to allow states to certify IP CTS providers; allowing states to regulate market entry is quintessential public utility-type regulation that is inappropriate for information services. *See RIF Order*, 33 FCC Rcd 427-28 ¶ 195 & n.730.

decades has recognized that states may not regulate information services."[130] Devolution thus faces significant legal and policy problems.

2. Devolution Would Result in Substantial Costs and Inefficiencies.

Additionally, devolution would result in substantial costs and inefficiencies. Section 225 directs the Commission to ensure that TRS are available "in the most efficient manner."[131] While the Commission has some discretion as to how it achieves that standard, it is required to avoid waste.[132] State administration over user eligibility determinations, provider certifications, and funding would result in substantial unnecessary costs for states or the TRS Fund, and would create a system of duplicative regulation that would increase costs for providers, driving down investments in service quality and innovation, and decrease competition among providers.

a. This Proposal Would Impose Costs on the States, as an Unfunded Mandate or on the TRS Fund, That Outweigh Any Benefits.

Devolution may require significant state investment before states could begin certifying IP-based TRS.[133] In addition, even assuming states seek to utilize their equipment distribution programs ("EDPs") to perform these functions, several states lack mature EDPs and would need to create the infrastructure.[134] The Commission either could force states to incur these costs as an

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[130] FCC, *Chairman Pai Statement on Eighth Circuit Affirmation That State Efforts to Regulate Information Services Are Preempted* (Sept. 7, 2018).

[131] 47 U.S.C. § 225(b)(1).

[132] *See Sorenson Communications, LLC v. FCC*, 897 F.3d 214, 227-28 (D.C. Cir. 2018).

[133] *See* 47 C.F.R. § 64.606 (requiring that IP-based TRS providers receive certification by the Commission).

[134] CaptionCall recently reviewed publicly available information and believes that Idaho, Michigan, New York, Ohio, and Washington, DC do not have statewide EDPs, although Idaho has state-run demonstration centers and Ohio has distribution in two cities. The *Further Notice* cites information stating that only Delaware, Michigan, and New York do not have EDPs, but the information is from 2015. *See Further Notice* ¶ 128 n.354.

unfunded mandate, or could permit states to recover such costs from the TRS Fund. But in either case, the costs associated with this proposal would substantially outweigh any benefits.

1) The Costs for States to Determine User Eligibility Would Be Substantially above $9 Million Per Year.

The *Further Notice* acknowledges that states would incur some costs associated with user eligibility determinations—projecting that states could conduct evaluations of new IP CTS users for approximately $9 million per year.[135] But this figure is likely *substantially* under-stated.

First, the Commission substantially underestimates the likely cost per test. The Commission predicts the cost will be on the lower end of a wide range ($50-$250 per test)—and that range itself is based on costs for current, mature state programs with significantly lower demand than would be the case if states were exclusively responsible for determining user eligibility.[136] Several states do not currently have EDPs—and over a dozen others run EDPs through non-profit, for-profit, or educational institutions. Many of these states thus will have to obtain additional state-law authorizations, acquire infrastructure, and hire and train new personnel before performing any eligibility assessments.[137]

Second, the Commission's assumption that there will be 6000 new tests per month is too low and unrealistic.[138] The Commission also problematically equates the number of tests per

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[135] *See Further Notice* ¶ 125.

[136] *See Further Notice* ¶ 125.

[137] *See Further Notice* ¶ 128 & n.354. Additionally, the low cost per test does not take into account possible changes to the eligibility framework. The cost per test thus is likely to be *higher* than the top of the range for tests in the status quo. *See Further Notice* ¶ 132.

[138] *Further Notice* ¶ 125 ("Assuming no change in the current rate at which new users are being added . . . ."). Indeed, CaptionCall alone may register **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION: [redacted] :END HIGHLY CONFIDENTIAL INFORMATION]]** new users per month.

month to the number of new registered users per month—and thus fails to account for the costs of any test where a user is not found to be eligible. And, most importantly, the projection is based on an express assumption that there will be no "change in the current rate at which users are being added,"[139] which is in tension with the *Further Notice*'s recognition that demand for IP CTS has increased over time.[140]

Third, placing the responsibility on states to make all eligibility determinations would drastically increase the costs either to state governments and/or the TRS Fund. Today, user eligibility assessments for IP CTS are primarily performed by third-party HHPs. HHPs are not permitted to receive compensation for this function from providers, and they do not recover their costs from the TRS Fund. If the Commission were to require states to perform all eligibility determinations, the costs associated with user eligibility determinations would either have to be borne by the states or would become recoverable from the TRS Fund.[141]

2) States Certification of IP CTS Providers Would Also Create Substantial Additional Costs.

Costs associated with user eligibility determinations are only *one* category of the new costs that would be created if the Commission were to proceed with broad devolution of administration

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[139] *Further Notice* ¶ 125.

[140] *See Further Notice* ¶ 8. As noted, this increase in demand is attributable to the growing population of individuals with hearing loss, *see supra* notes 44-49 and accompanying text, and to the increasing incidence of testing for and treatment of hearing loss, *see supra* notes 50-52 and accompanying text.

[141] *See Further Notice* ¶ 127. State EDPs currently receive some outlays from the TRS Fund for *assessments* of individuals who qualify for the NDBEDP to determine whether their communications needs are met by specific technologies. *NDBEDP Order*, 31 FCC Rcd 9224-25 ¶¶ 106-108. But, as noted, the NDBEDP program also permits *eligibility determinations* to be established through third-party certifications, so EDPs' costs associated with user eligibility determinations are unlikely to be substantial currently. *See id.* at 9202-03 ¶¶ 58-60. Moreover, most states appear to fund their EDPs primarily through state-level assessments on telephone lines or voice service providers, or other state and private funding mechanisms. If states were to take over administration of IP CTS, their current budgets would be inadequate to exclusively handle the large and growing user base for IP CTS.

over IP CTS. For example, designating states to oversee provider certifications would require states to devote resources to build the infrastructure and hire staff to review (and then to actually conduct the review of) provider applications, based on the Commission's minimum standards.[142] Additionally, requiring new IP CTS providers to obtain 50+ certifications would add substantial administrative costs relative to the current rules, which permit IP CTS providers to receive nationwide certification from the Commission.

b. Devolution Would Result in Other Inefficiencies and Burdens That Would Harm IP CTS Providers and Stifle Competition.

For a state to be able to assume administrative responsibilities for IP CTS, there must be at least one state entity that can perform the necessary tasks, including user assessments, provider certifications, funding and oversight, and so forth. Yet, several states lack the infrastructure or laws necessary to take on all of these functions. Indeed, the *Further Notice* acknowledges that at least some states appear to lack statutory authority that would be necessary to administer the IP CTS program as a matter of state law.[143]

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[142] *Cf. VRS Call Practices R&O*, 26 FCC Rcd at 5589-90 ¶ 96 (describing that state certification of IP-based TRS providers could be problematic because states "generally have little or no incentive to either verify the qualifications of the providers with which they contract or exercise the oversight needed to ensure full compliance with the Commission's TRS rules once . . . service commences").

[143] *See Further Notice* ¶ 112 & n.321; *see also* Comments of the Nebraska Public Service Commission, CG Docket Nos. 13-24, 03-123, at 2-4 (Sept. 14, 2018). The California Public Utilities Commission, for example, notes that it lacks jurisdiction over VoIP and other IP-enabled services. *See* Comments of the California Public Utilities Commission and the People of the State of California at 3-4, CG Docket Nos. 13-24, 03-123 (Oct. 23, 2013). In the 2013 rulemaking proceeding, the Florida Public Service Commission likewise requested a minimum of "five years" for Florida to make necessary legislative changes to assume administration over IP CTS funding. *See* Comments of the Florida Public Service Commission at 6-7, CG Docket Nos. 13-24, 03-123 (Sept. 27, 2013).

The Commission should therefore refrain from mandating devolution of some or all of IP CTS administration to states to avoid a fractured regulatory regime would impose tremendous administrative and compliance costs on IP CTS providers.[144]

D. The Commission Should Not Require or Enable States to Take over Determinations of User Eligibility for IP CTS.

The Commission also seeks comment on whether "state TRS programs should be required" to determine user eligibility for IP CTS going forward.[145] CaptionCall currently accepts eligibility certifications from state programs and does not oppose continuing to do so. But the Commission should not require or allow *any* state to become the sole option for a user to be certified as eligible. Doing so would impose significant burdens on states and eligible users.[146]

First, there is no indication in the *Further Notice* that states have the resources, personnel, or infrastructure to handle the increased demands associated with testing thousands of new users per month. Moreover, the Commission also has proposed requiring user assessments to evaluate

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[144] *Cf. RIF Order*, 33 FCC Rcd at 426-27 ¶¶ 194-95 (2017) (affirming the need for a "uniform set of federal regulations, rather than . . . a patchwork that includes separate state . . . requirements" that would inhibit deployment); *Vonage II*, 19 FCC Rcd at 22,424 ¶ 32 (describing that "patchwork regulation" by states deters market entry and competition). In addition to being costly for the reasons identified above, *see supra* note 142 and accompanying text, devolution of provider certifications also would be inefficient and harmful to consumers because virtually every state (with the possible exception of California) operates a single-vendor TRS program. *See Further Notice* ¶ 115 & n.324. Thus, devolution of provider certifications also could stymie competition. *In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Report and Order and Further Notice of Proposed Rulemaking, 15 FCC Rcd 5140, 5157 ¶ 36 (2000) ("[G]iving consumers a choice among different TRS providers might well improve the quality of TRS service in different states.").

[145] *Further Notice* ¶ 123; *see also id.* ¶¶ 123-128.

[146] It also presents a risk of recreating the state-by-state patchwork of TRS availability that motivated enactment of the ADA in the first place. *See* H.R. Rep. No. 101-485(IV), at 27-28 (1990), *as reprinted in* 1990 U.S.C.C.A.N. 512, 516-17 (describing that because "most states ha[d] not progressed as rapidly in the deployment of [telecommunications devices for the deaf] as some others" and because interstate systems of such devices were "virtually nonexistent" it was necessary for Congress "to establish a seamless interstate and intrastate relay system for the use [of such devices] that will allow a communications-impaired caller to communicate with anyone who has a telephone, anywhere in the country").

whether alternative technologies would enable the individual to receive functionally equivalent telephone communications.[147] State entities thus would need to be familiar with multiple assistive technologies, and be able to conduct evaluations that account for different types of calls, in different environments, subject to different signal-to-noise ratios, with different speakers. There is no indication that states have these capacities—or that private-sector partners exist to support these functions.[148]

Second, by CaptionCall's estimate, slightly more than 25 states run their own EDPs, whereas others run equipment distribution through non-profit organizations, schools/universities, or for-profit enterprises—and some have no EDP at all. Yet the *Further Notice* assumes, without explanation, that all states are equally capable of handling user eligibility determinations, that all state EDPs are comparably mature and functional, and that all state EDPs are stable year to year. CaptionCall expects that many states would effectively have to redesign their TRS programs and EDPs from scratch.

Third, the Commission indicates that state EDPs are "*relatively* convenient" given there may be multiple locations "throughout the country." But today, users may receive certifications from HHPs *within their community*. Even states that are willing to expend the necessary resources to establish multiple locations and hire qualified personnel to conduct user assessments will not match the convenience of being certified by a third-party HHP in one's own neighborhood. Moreover, IP CTS users are often people who are older—who may have difficulty with mobility

147 *See Further Notice* ¶ 132.

148 The Commission's experience with the NDBEDP program is instructive: After its NDBEDP pilot program, commenters reported that "a continuing shortage of qualified trainers ha[d] limited the timeliness, amount, and quality of training" that equipment recipients received through the program, and the Commission had to acknowledge that its "original expectation that the shortage of qualified trainers could be resolved through collaboration and partnerships . . . ha[d] not happened." *NDBEDP Order*, 31 FCC Rcd at 9230 ¶ 120.

or difficulty driving (for example, due to declining vision)—or people with other impairments. Asking such individuals to travel more than short distances, to spend hours away from work, or to attend multiple visits, may be tantamount to denying them access to a life-changing service, especially in more sparsely populated states. Courts have found that requiring certain groups of people to travel and to navigate complex state agencies can be an impermissible burden on another federal right—viz., the right to vote.[149] The same logic applies to imposing such burdens on the federal civil right, guaranteed by the ADA, to effective communications by phone.[150]

V. The Commission's Proposals Regarding Marketing, Installation and Reclamation, On/Off Functionality, and Call Monitoring Are Contrary to Law and/or Suffer from Significant Drawbacks.

The *Further Notice* identifies several other "provider practices" as concerns. The Commission's proposals regarding these "provider practices" lack any basis of support in the current record, are otherwise unnecessary or under-developed, and could raise significant legal

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[149] *See Crawford v. Marion Cty. Election Bd.*, 553 U.S. 181, 211-16 (2008) (Souter, J., dissenting); *id.* at 199 (Opinion of Stevens, J.) (recognizing that heavier burdens of obtaining a state ID would apply to "elderly persons" and "persons who because of economic or other personal limitations may find it difficult" to do so); *Frank v. Walker*, 819 F.3d 384, 386 (7th Cir. 2016) (recognizing that "the inconvenience of making a trip to [the department of motor vehicles and] gathering the required documents" could qualify as "high hurdles" for certain persons or classes of persons (internal quotation marks omitted)).

[150] Permitting or requiring states to be the sole entities responsible for determining IP CTS user eligibility also presents risks to the states themselves. If state TRS programs and EDPs are not capable of handling the increased demand of thousands of new users per month, they could face "program accessibility" lawsuits under Title II of the ADA or Section 504 of the Rehabilitation Act. Title II requires that "no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity." U.S.C. § 12132. This imposes an "affirmative obligation on public entities" to make services available to individuals with disabilities. *See, e.g.*, *Toledo v. Sanchez*, 454 F.3d 24, 31-32 (1st Cir. 2006) ("Title II [of the ADA] imposes an affirmative obligation on public entities to make their programs accessible to qualified individuals with disabilities, except where compliance would result in a fundamental alteration of service or impose an undue burden."); *Bassilios v. City of Torrance*, 166 F. Supp. 3d 1061, 1069 (C.D. Cal. 2015) (describing that elements of ADA Title II and Rehabilitation Act Section 504 claims are "largely coextensive"). Even if these suits were unsuccessful, they still would impose additional costs on states. *Cf. In re Rules and Regulations Implementing the Telephone Consumer Protection Act of 1991*, Declaratory Ruling, 31 FCC Rcd 7394, 7415 (2016) (Statement of Commissioner Michael O'Rielly) (criticizing declaratory ruling for leaving "unanswered whether state or local agencies may be subject to TCPA lawsuits" and for "expos[ing]" state and local governments to "lawsuits that divert tax dollars away from serving the public").

concerns. Given that the Commission just adopted new rules, the Commission should at the very least defer adopting any new proposals until it can assess whether they are necessary.

A. The Proposed Marketing Requirements Are Unnecessary, Raise First Amendment Concerns, and Could Discourage Individuals Experiencing Hearing Loss from Seeking Care.

The Commission proposes to require that "all provider-distributed online, print, and orally delivered materials used to market IP CTS be complete and accurate," noting that this standard would "prohibit currently advertised statements suggesting that any amount of hearing loss causing any degree of difficulty will qualify consumers for IP CTS."[151] The Commission also requests comment on a requirement that providers "eliminate from promotional materials . . . promises of a free phone for anyone with hearing loss" that do not include an indication that the service and associated phones are "only intended for individuals who have a hearing loss that makes it difficult to use the phone."[152] These proposals suffer from a host of problems.

First, the rules are not necessary and fit within a troubling trend of the Commission's attempting to address perceived waste, fraud, and abuse by censoring disfavored speech (*i.e.*, marketing) by disfavored speakers (*i.e.*, IP CTS providers).[153] In 2013, the Commission adopted a prohibition on provider-HHP "joint marketing arrangements," without providing any guidance as to what practices qualify as joint marketing.[154] A few months ago, the Commission adopted new disclosure requirements that IP CTS providers must include in advertising brochures,

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[151] *See Further Notice* ¶ 140.

[152] *See Further Notice* ¶ 141.

[153] *See supra* notes 112-115 and accompanying text.

[154] *See* 47 C.F.R. § 64.604(c)(8)(iii); *2013 IP CTS Order*, 28 FCC Rcd at 13,434-35 ¶ 28.

websites, user manuals, and other informational materials and websites, which were predicted to "prevent casual or inadvertent use of IP CTS."[155] And now the Commission is considering adopting a vague requirement that all marketing be "complete and accurate." CaptionCall has serious concerns that this requirement could be enforced in increasingly strict ways to censor speech for not being "complete" enough.[156]

Speech restrictions giving rise to "uncertainty among speakers" about what they may and may not do are "a matter of special concern" under the First Amendment.[157] Such vagueness has an "obvious chilling effect on free speech."[158] Here, the *Further Notice* offers no explanation of what is necessary to provide "complete" information—which could include virtually limitless technical, operational, logistical, and cost information about IP CTS service. The failure to articulate a coherent and specific requirement could have the practical effect of suppressing speech entirely.[159] Adopting such a requirement also would chill speech by "delegat[ing] overly broad discretion to the decisionmaker"—here, to the FCC's enforcement arm—to decide through

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[155] *See Further Notice* ¶ 42.

[156] The *Further Notice* does not include, for example, a materiality requirement—*i.e.*, that all materials provide information that are "material" or "necessary" for consumers to make informed decisions about whether they need IP CTS. *See RIF Order*, 33 FCC Rcd at 438 ¶ 215 (requiring that broadband disclosures must contain information "sufficient to enable consumers to make informed choices"); *see also, e.g.*, *City of El Cenizo v. Texas*, 890 F.3d 164, 190 (5th Cir. 2018) ("The inclusion of [a materiality] qualifier makes the challenged phrase more definite, not less, and materiality standards are routine in the law."); *cf. United States v. Sandidge*, 863 F.3d 755, 757 (7th Cir. 2017) (saving otherwise vague condition of supervised relief from Due Process void for vagueness challenge by adding "materiality" requirement).

[157] *Reno v. ACLU*, 521 U.S. 844, 871-72 (1997); *see id.* at 864 (explaining that "vagueness . . . [is] relevan[t] to the First Amendment overbreadth inquiry"); *see also Kolender v. Lawson*, 461 U.S. 352, 358 n.8 (1983) ("[W]e have traditionally viewed vagueness and overbreadth as logically related and similar doctrines.").

[158] *Reno*, 521 U.S. at 872.

[159] *See Reno*, 521 U.S. at 871; *see also Grayned v. City of Rockford*, 408 U.S. 104, 109 n.5 (1972).

improvisation when materials are incomplete enough to trigger enforcement actions or enforcement threats, without notice, on a case-by-case basis.[160]

Apart from its vagueness, this proposal also risks "sweep[ing] too broadly, penalizing a substantial amount of speech that is constitutionally protected."[161] The *Further Notice* proposes to apply the "complete and accurate" standard to "all provider-distributed online, print, and orally delivered materials used to market IP CTS"—without defining when materials are being "used to market" IP CTS. But it is not difficult to imagine this proposal sweeping in a great deal of non-commercial speech. For example, CaptionCall undertakes a number of efforts to educate consumers about hearing loss and the value of IP CTS service, and it makes these materials available to HHPs so that HHPs can use them in educating their own consumers as well. These materials include blog posts about hearing loss, conference presentations, print articles, and social media campaigns—none of which could be described as merely proposing a transaction.

Second, these proposals are described as necessary to address messaging that is "misleading or lacking complete information" that supposedly results in wasteful or unnecessary IP CTS usage, but the only two specific examples in the *Further Notice* lack any nexus to the Commission's concerns. Take the example of advertisements stating that IP CTS may be "for anyone with hearing loss who has difficulty hearing on the phone."[162] There is nothing inaccurate or misleading about this statement: Under the current rules, there is no threshold amount of hearing loss that is required for an individual to be eligible to receive IP CTS.[163] Nor does the Commission

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[160] *Forsyth Cty. v. Nationalist Movement*, 505 U.S. 123, 129 (1992).

[161] *Forsyth Cty.*, 505 U.S. at 130.

[162] *Further Notice* ¶ 140 & n.377.

[163] *2013 IP CTS Order*, 28 FCC Rcd at 13,458-59 ¶ 82.

point to any indication that such marketing results in unnecessary or wasteful IP CTS usage—which cannot be assumed, at least in CaptionCall's case, where the service is offered only to users who are certified as eligible by an HHP based on his or her professional judgment, under various state laws and ethical codes. The example of advertisements that offer a "free phone" is no more persuasive. Such advertisements are "accurate," at least insofar as the provider responsible for such marketing actually makes the equipment available for free. And there is no basis for concluding that such advertisements result in waste or fraud, given that users who respond to such advertisements must be certified as eligible by a licensed HHP. This proposed restriction also falls short because IP CTS providers do not receive any compensation for providing the phone itself (as distinct from the service) to users;[164] in other words, the Commission's real concern relates to unnecessary or wasteful use of the *service*, but its censorship targets advertisements describing free equipment, which is not compensable. This is too attenuated for First Amendment purposes.[165]

Third, the speech that would be subject to the *Further Notice*'s marketing restrictions is uniquely beneficial. As the Supreme Court has stressed, "[a] consumer's concern for the free flow of commercial speech often may be far keener than his concern for urgent political dialogue"—a "reality [that] has great relevance in the fields of medicine and public health."[166] This general

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[164] *See, e.g.*, *Further Notice* ¶ 33.

[165] *See, e.g.*, *Rubin v. Coors Brewing Co.*, 514 U.S. 476, 486 (1995) (to survive First Amendment inquiry, restriction on commercial speech must "directly advance the [asserted] governmental interest and be no more extensive than necessary to serve that interest").

[166] *See Sorrell*, 564 U.S. at 566 (internal quotation marks omitted); *see also Nat'l Inst. of Family & Life Advocates v. Becerra*, 138 S. Ct. 2361, 2374 (2018) (noting that "this Court has stressed the danger of content-based regulations in the fields of medicine and public health" (internal quotation marks omitted)). Because the vague requirement that all material used to market IP CTS be accurate and complete sweeps in noncommercial speech and compels far more than a specific and purely factual statement, heightened scrutiny applies. *See, e.g.*, *Nat'l Inst. of Family & Life*

maxim has special salience in the context of hearing loss. Individuals who are beginning to experience hearing loss often hesitate to seek diagnosis and care for numerous reasons, including pride, vanity, and perceived stigma.[167] Providers' marketing of new products and services that allow such individuals to continue to speak in their own voice to family, loved ones, doctors, and others, is important to counteract this tendency. As noted, consumer groups have specifically praised CaptionCall's marketing in this respect.[168]

Fourth, the Commission's proposal to expand its incentives prohibition to include incentives to "any person"—which encompasses service providers from whom CaptionCall does not accept eligibility certifications—"for the purpose of encouraging referrals of potential users . . . or use of IP CTS" raises First Amendment concerns if not cabined.[169] In the *2013 IP CTS Order*, the Commission acknowledged that there were valid concerns that its incentives prohibition should not interfere with legitimate forms of outreach that inform consumers and the general public about the benefits of IP CTS. The rule that the Commission adopted was thus tied to user registrations, which captured the Commission's "intent to prohibit any kind of reward for signing up . . . consumers or getting them to use the service, rather than [to] prohibit advertising and outreach conducted to simply educate consumers about this service."[170] The *Further Notice* seems to depart from this approach, potentially prohibiting lawful advertising and marketing

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Advocates, 138 S. Ct. at 2372; *Expressions Hair Design v. Schneiderman*, 877 F.3d 99, 103-04 (2d Cir. 2017); *Nat'l Ass'n of Mfr. v. SEC*, 800 F.3d 518, 527 (D.C. Cir. 2015).

[167] *See, e.g.*, Margaret I. Wallhagen, *The Stigma of Hearing Loss*, 50 Gerontologist 66 (2009), https://academic.oup.com/gerontologist/article/50/1/66/692298; Susan Seliger, *Why Won't They Get Hearing Aids?*, N.Y. Times (Apr. 5, 2012), https://newoldage.blogs nytimes.com/2012/04/05/why-wont-they-get-hearing-aids/?_r=0.

[168] *See supra* note 53.

[169] *Further Notice* ¶ 143.

[170] *2013 IP CTS Order*, 28 FCC Rcd at 13,428 ¶ 16; *see also id.* at 13,432-33 ¶¶ 24-25.

campaigns that are designed to create awareness of IP CTS, on the theory that such campaigns "encourag[e] . . . use of IP CTS." For reasons discussed above, this theory is too attenuated to support censorship of even pure commercial speech. The *Further Notice* also conflates two distinct concepts: "referrals" (where a non-certifying provider identifies a potential customer, without certifying as to his or her eligibility) and "certifications" (where a specifically licensed HHP evidences, by attestations under penalty of perjury, that a user is eligible to receive IP CTS). Applying the incentive prohibition to the former would fail even less exacting scrutiny, because a "referred" individual still must be independently certified before he or she can receive IP CTS that is compensable from the TRS Fund.

B. Aspects of the Proposed Installation Rules Would Impose Costs That Significantly Outweigh Any Possible Benefits.

The Commission requests comment on rules that it indicates are intended to prevent unnecessary usage by registered users—as well as unauthorized use of a registered user's device by someone else in the home.[171] CaptionCall already takes numerous steps during installation to prevent wasteful and unauthorized usage, and would be willing to augment its current efforts. But several aspects of the proposals are unnecessary and would impose unreasonable costs on providers or burdens on users that exceed any potential benefits.

First, the *Further Notice* proposes to require that, whenever there is a home installation, the installer must explain to the consumer, prior to conducting the installation: "(1) the manner in which IP CTS works, (2) the per-minute cost of providing captioning on each call (i.e., the applicable rate of provider compensation), and (3) that the cost of captioning is funded through a

[171] *Further Notice* ¶¶ 142, 146-147.

federal program."[172] This proposal is intended to "ensure that consumers are given full information about the nature and costs of IP CTS."[173]

During home installation, CaptionCall currently informs new users—and requires that these new users confirm—that (1) they must suffer from hearing loss that necessitates the use of IP CTS; (2) they understand that captions are provided by a live captioning agent; (3) they understand that the cost of IP CTS calls are funded through a federal program; and (4) they must not permit unregistered users to make captioned calls on the IP CTS phone. But there is no basis for requiring IP CTS providers to inform new customers of the "per-minute cost of providing captioning on each call." This information risks creating confusion for new users who do not pay the per-minute cost of captioning. This disclosure would be equivalent to mandating signs on disability-accessible ramps or bathrooms indicating how much they cost to construct: It risks creating additional stigma for individuals with disabilities and chilling eligible users from using a service they are statutorily entitled to use.

Second, the *Further Notice* proposes to require IP CTS providers biennially to obtain new self-certifications from users regarding their continuing need for the service.[174] In this case, the burdens outweigh any conceivable benefits.

Indeed, there is no evidence that a biennial self-certification rule would yield *any* marginal benefits. The Commission's rules already require that IP CTS equipment include a warning label about unauthorized use, yet the *Further Notice* does not explain why this requirement has not been

[172] *Further Notice* ¶ 142 (footnote omitted).

[173] *Further Notice* ¶ 142.

[174] *Further Notice* ¶ 142.

effective.[175] Similarly, providers "have an ongoing obligation to ensure the validity of the minutes they submit for compensation,"[176] and the *Further Notice* does not provide a reason why this requirement, buttressed by the Commission's audit procedures, are not an adequate check against compensation for unauthorized minutes. CaptionCall also actively pursues the reclamation of its devices when the authorized user no longer needs the service. And the general reason for discontinuance is that the user no longer has the capacity to use the phone. Rarely, if ever, does a user who was eligible for IP CTS cease to need the service because his or her hearing *has improved*. Hearing loss almost always gets worse over time, which is another reason this requirement addresses a "bogeyman."[177]

Weighing against these minimal benefits are potentially considerable costs. The Commission currently does not have any similar recertification requirements for other forms of TRS,[178] and there is no basis for imposing this requirement here.[179] Moreover, because CaptionCall's users are primarily people who are older, who may be restricted in terms of mobility or may have difficulty navigating multiple technology platforms, electronic signatures should be acceptable. This would be consistent with the Commission's current mandatory minimum

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[175] 47 C.F.R. § 64.604(c)(11)(iii); *2013 IP CTS Order*, 28 FCC Rcd at 13,460-61 ¶¶ 87-90.

[176] *Further Notice* ¶ 146.

[177] *Sorenson Commc'ns*, 755 F.3d at 710.

[178] *See, e.g., Video Relay Service Providers May Begin Submitting Data to the TRS User Registration Database*, Public Notice, 32 FCC Rcd 10,467 (2017) (describing self-certification requirements for VRS).

[179] The *Further Notice* is silent on how IP CTS providers would be expected or permitted to obtain such recertifications. If providers must invest in new systems for sending, receiving, and acquiring recertifications those costs could be significant, and would be allowable labor and systems costs if the Commission were to move to a submitted-cost rate methodology.

standards,[180] and would avoid creating unnecessary hurdles that prevent eligible users from continuing to receive the service.[181]

C. It Is Unnecessary to Require IP CTS Providers to Enable One-Button "Captions On/Off" Functionality, and so Requiring Would Harm Competition.

The Commission proposes requiring IP CTS equipment to allow customers to turn captions "*on or off*" with a "single step."[182] The Commission indicates this proposal is necessary because "most IP CTS devices now automatically default to have captions *on* at the start of a call."[183] Yet, the Commission cites no evidence for this proposition. And indeed, this description is incorrect for CaptionCall: Captioning is set to "on" as a default during home installations only if the user, or a designated caregiver, makes the affirmative election to have the device so set. Thus, the default is for captions to be "off," but a user may opt in to having the default set to captions "on." And, as noted, during installation, the CaptionCall representative is required to inform the customer—who must self-certify his or her understanding—that captioning is only for the authorized user. The Commission's warning label rule also deters unauthorized usage.

Similarly, the *Further Notice* assumes that anything other than a one-button "off" function somehow impedes users from being able to turn off captions before placing a call or while a call

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[180] 47 C.F.R. § 64.604(c)(9)(iv).

[181] CaptionCall is not opposed to a rule requiring IP CTS providers "to either disable the IP CTS capability of an end-user device or [to] ensure that the consumer (or his or her designee) returns the device to the provider, after notification that the authorized user is no longer using the device." *Further Notice* ¶ 147. But here, too, the details are critical. If providers were not permitted to satisfy this requirement through remote deactivation of IP CTS capability—and were instead required to ensure physical reclamation within a certain period of time—the additional labor costs could be significant, and should be compensable from the TRS Fund under a submitted-cost methodology.

[182] *See Further Notice* ¶¶ 149, 151.

[183] *See Further Notice* ¶ 149.

is in progress. But CaptionCall provides specific instruction to new users during installation that includes turning captions off. And, the *Further Notice* points to no evidence that the current "off" functionality of any IP CTS provider's equipment is difficult, burdensome, or complicated for users—or otherwise results in unnecessary usage. Thus, like the 2013 "Default Off" rule, this proposal addresses a problem "whose existence [has not been] verified."[184] The proposal is thus unnecessary.

D. Requiring CAs to Identify Calls or Patterns for Possible Waste or Fraud Would Violate Consumer Privacy and Increase Costs to the TRS Fund, without Meaningfully Reducing Waste, Fraud, or Abuse.

The Commission should not require IP CTS providers to have processes in place for CAs to identify calls or patterns that may suggest noncompliance with IP CTS program rules.[185] Doing so would violate customer privacy, as it requires CAs to monitor the contents of conversations. It could create unique problems for calls between users and their medical providers or attorneys. And finally, adopting this requirement would be unworkable in practice, while dramatically

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[184] *Sorenson Commc'ns*, 755 F.3d at 710. CaptionCall does not believe that CapTel's patents are broad enough to reach one-button on/off functionality and also has disputed the validity of the patents, which are the subject of ongoing litigation. But if the Commission were to adopt this proposal, and if the patents were found to be valid, CapTel may, on that basis, demand licensing fees based on compliance with the adopted rule. To prevent this outcome, the Commission should, at minimum, wait to adopt this proposal until a decision is rendered with respect to CapTel's patents that CapTel might assert to cover this functionality. Alternatively, the Commission could prevent this harm by requiring CapTel to license its technologies on reasonable and non-discriminatory terms. CapTel's representation that it would license at "reasonable rates" was a condition precedent to the Commission's declaring IP CTS a compensable TRS in the first instance. *See In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Declaratory Ruling, 22 FCC Rcd 379, 389 ¶ 24 (2007). A CaptionCall petition remains pending, which seeks to hold CapTel to this standard. *See Request for Comment on Petition Filed by Sorenson Communications, Inc. and CaptionCall, LLC, Regarding Licensing of Internet Protocol Captioned Telephone Service Technology*, Public Notice, 29 FCC Rcd 14,359 (2014). Instead, CapTel has engaged in successive litigations based on its patents, including seeking injunctive relief. If the Commission adopts this proposal, it would be tantamount to setting an industrywide standard, further justifying the adoption of a reasonable and non-discriminatory licensing requirement. *Cf. In re Advanced Television Systems and Their Impact upon Existing Television Broadcast Service*, Fourth Report and Order, 11 FCC Rcd 17,771, 17,794 ¶¶ 54-55 (1996).

[185] *See Further Notice* ¶¶ 152-153.

increasing providers' labor costs. In short: The Commission should not compromise the confidentiality of all IP CTS calls or interfere with CAs' performance of the critical task of captioning.

The Commission has recognized since the very beginning of the TRS program, preserving the confidentiality of TRS calls is necessary for providers to offer functional equivalence—because ordinary telephone communications are also highly confidential.[186] The Commission has described that "relay services are unique in that, in the present technological environment, they utilize human CAs who see and hear private conversations while acting as transparent conduits relaying conversations without censorship or *monitoring* functions."[187] The *Further Notice* does not explain how IP CTS providers could establish processes for CAs to flag potentially problematic calls without requiring CAs to engage in some amount of active monitoring of IP CTS calls, in violation of this longstanding principle.

Requiring CAs to listen and tag calls could be uniquely problematic in the context of calls between users and their medical providers. Currently, under an agreement between the Commission and the Department of Health and Human Services, neither individual CAs nor IP CTS providers are required to enter into disclosure agreements under the Health Insurance Portability and Accountability Act ("HIPAA"), when a covered medical provider contacts a patient using TRS.[188] If this were adopted, however, such calls would be more problematic under the

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[186] *See In re Telecommunications Services for Individuals with Hearing and Speech Disabilities, and the Americans with Disabilities Act of 1990*, Report and Order and Request for Comments, 6 FCC Rcd 4657, 4659 ¶ 13 (1991) ("The ADA prohibition of disclosure [of the content of any relayed conversation] furthers the statutory purpose that TRS be functionally equivalent to regular telephone service. We believe that confidentiality is essential to the service, and that users of TRS can have confidence in the basic privacy of their conversations.").

[187] *Id.* (emphasis added).

[188] *See Clarification of the Use of Telecommunications Relay Services (TRS) and Health Insurance Portability and Accountability Act (HIPAA)*, Public Notice, 19 FCC Rcd 10,677 (2004).

HIPAA Privacy Rule, because CAs would be actively listening when health information is being relayed from the medical provider to the patient in an effort to understand and analyze call content rather than serve as a mere conduit. In addition to HIPAA concerns, any such rule could have unintended consequences for calls with lawyers, social workers, mental health professionals, and religious counselors.

Finally, the proposal would be utterly unworkable in practice.[189] An IP CTS user might not need captions for *portions* of some calls—*e.g.*, where the subject matter is familiar, the background signal-to-noise ratio is less difficult, or the user is talking to one person (*e.g.*, her son) before being handed off to someone else (*e.g.*, her granddaughter)—but might need captions for other portions of the same call. Thus, even if a CA could be trained to identify when a user is not relying on captions (which they cannot), the CA still would have no way of knowing *why* a user is not relying on captions during any specific portion of a call. Nor should such calls be flagged as possibly involving fraud. The fact that a user may not always rely on captions does not mean that the user does not need the service for effective communications via telephone; hearing loss is individualized, not just to the user, but also to the circumstances and contexts of particular calls, and a CA simply will not have the necessary context to report calls where the user appeared not to rely on captions as fraudulent.

[189] From a practical standpoint, for example, CAs could not possibly be expected to have the necessary experience to learn and apply the patchwork of laws governing fraud in every state.

VI. The Commission Should Adopt a Price Cap for All IP CTS Providers for a Three-to-Five Year Period, and Should Set the Initial Rate at $1.75 per Minute.

In proposing to adopt a new rate methodology for IP CTS, the Commission identifies the following goals: (1) encouraging efficient provision of IP CTS service,[190] (2) maintaining service quality,[191] and (3) creating incentives for providers to adopt innovative technologies, such as ASR.[192] To best achieve these goals, the Commission should adopt an IP CTS rate methodology that is designed to approximate market-based rates. As the Commission has recognized, "market forces" in competitive markets "work[] to spur entry, innovation, and competition" among the market's participants.[193] And—as Professor Michelle Connolly discusses in her attached Declaration—in the absence of competitive markets, ratemaking should seek to mimic prices that would be produced in a competitive market.[194] Indeed, the Commission adopted the Multistate Average Rate Structure ("MARS") rate-setting methodology in large part because it "uses an average of *competitively bid* state rates as a measure of [providers'] reasonable costs," and "[t]he competitive bidding process necessarily encourages providers to minimize costs and increase

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[190] *Further Notice* ¶ 70 (seeking to "provide incentives for providers to increase their efficiency through innovation and cost reduction"); *id.* ¶ 94 (seeking to "encourage[] higher-cost providers to become more efficient"); *see also* 47 U.S.C. § 225(b)(1) (Commission must ensure that functionally equivalent IP CTS service is provided "in the most efficient manner"). Relatedly, the *Further Notice* recognizes that the optimal rate regime will "simplify the rate-setting process" and "facilitate TRS provider planning and budgeting." *Id.* ¶ 70.

[191] *Further Notice* ¶ 94; *see also id.* ¶ 70 (recognizing need "to allow recovery of reasonable provider costs").

[192] *Further Notice* ¶ 96 (seeking to "appropriately encourage migration to" ASR); *see also id.* ¶ 89 (asking how methodology would "affect provider incentives to operate more efficiently, improve service quality, or invest in new technology, such as ASR").

[193] *In re Business Data Services In an Internet Protocol Environment*, Report and Order, 32 FCC Rcd 3459, 3462 ¶ 5 (2017) ("*2017 BDS Order*"), r*eview granted in part, decision vacated in part by Citizens Telecomms. Co. of Minn., LLC v. FCC*, No. 17-2296, -- F.3d --, 2018 WL 4083352 (8th Cir. Aug. 28, 2018).

[194] Connolly Decl. at 1. A copy of Professor Connolly's Declaration is attached as Appendix C.

productivity."[195] Although the Commission is now proposing to move away from the MARS methodology, it should not abandon the underlying goal of trying to approximate market-based rates.

To approximate market-based incentives, the Commission should adopt a price cap for IP CTS. Based on the evidence in the record, the initial rate should be $1.75 per minute for all calls: As Professor Connolly explains, a price cap with a sufficiently long price cap period would exert pressure on high-cost providers to achieve cost reductions, without forcing market exit that could harm competition.[196] The initial rate period should be three to five years, which provides certainty to allow providers to achieve significant savings through efficiency and to invest in new service offerings. During the initial period, rates should be adjusted annually, based on an X-Factor that is equal to the change in GDP-PI. At the conclusion of the initial rate period, the Commission should adjust the X-Factor based on a contemporaneous record, or conduct a reverse auction as outlined below to set IP CTS rates going forward. Finally, irrespective of the rate-setting methodology that the Commission adopts, all IP CTS providers should receive uniform compensation. The Commission should not adopt tiered rates for different sized providers, nor should the Commission adopt a separate rate for ASR-based service; likewise, if the Commission relies on an average allowed cost methodology, it must treat all IP CTS providers' intellectual-property licensing costs uniformly.

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[195] *See In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Report and Order and Declaratory Ruling, 22 FCC Rcd 20,140, 20,051, 20,153 ¶¶ 20, 25 (2007) (internal quotation marks omitted) ("*2007 TRS Order*").

[196] Connolly Decl. ¶¶ 66-72.

A. The Commission Should Adopt Price-Cap Regulation to Approximate the Incentives of Market-Based Pricing.

The Commission has recognized that price caps create positive incentives that "mirror the incentives for efficiency found in competitive markets,"[197] and encourage providers "to reduce costs, to invest efficiently in new plant and facilities, and to develop and deploy innovative service offerings."[198] If providers are able to lower costs, they reap increased profits.[199] Thus, price caps encourage regulated entities "to become more productive and innovative by permitting them to retain reasonably higher earnings while discouraging wasteful investment."[200] Because the rate is set initially and then automatically adjusts over time as efficiency improves, providers and the Commission both avoid the administrative burdens and arbitrariness of an approach based on determining providers' allowed costs.

The Commission has long recognized that price caps achieve significant benefits relative to other rate-setting methodologies for non-competitive markets, "because price caps are better suited to encouraging efficiency and innovation in the provision of services and, thus, are better

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197 *In re Regulatory Reform for Local Exchange Carriers Subject to Rate of Return Regulation*, Order on Reconsideration, 12 FCC Rcd 2259, 2262 ¶ 5 n.20 (1997) ("*Regulatory Reform Order*") (citing *In re Price Cap Performance Review for Local Exchange Carriers*, First Report and Order, 10 FCC Rcd 8961, 8965 (1995) ("*Price Cap Order*")); *2017 BDS Order*, 32 FCC Rcd at 3538 ¶ 180 ("[w]hen properly applied, price cap regulation replicates some of the beneficial incentives of competition"); *In re Joint Petition of Price Cap Holding Companies for Conversion of Average Sched. Affiliates to Price Cap Regulation and for Limited Waiver Relief*, Order, 27 FCC Rcd 15,753, 15,758 ¶ 12 (2012) ("*Price Cap Holding Order*") (price caps create "incentives for carriers to become more productive, innovative, and efficient").

198 *Regulatory Reform Order*, 12 FCC Rcd at 2262 ¶ 5 n.20 (citing *Price Cap Order*, 10 FCC Rcd at 8965).

199 *In re Access Charge Reform*, Sixth Report and Order in CC Docket Nos. 96-262 and 94-1 Report and Order in CC Docket No. 99-249 Eleventh Report and Order in CC Docket No. 96-45, 15 FCC Rcd 12,962, 12,969 ¶ 16 (2000) ("*Access Charge Reform Order*") ("Individual companies retain an incentive to cut costs and to produce efficiently, because in the short run their behavior has no effect on the prices they are permitted to charge, and they are able to keep any additional profits resulting from reduced costs."), *review granted in part, rev'd in part by Tex. Office of Pub. Util. Counsel v. FCC*, 265 F.3d 313 (5th Cir. 2001).

200 *2017 BDS Order*, 32 FCC Rcd at 3538 ¶ 180.

able to satisfy the goals of the Communications Act."[201] For these reasons, the Commission has described specifically that "incentive regulation is superior to rate of return."[202] And, as a result, the Commission has moved away from rate of return regulation and adopted price caps in multiple contexts.[203] It should do so here as well, as Professor Connolly's Declaration explains.[204]

By contrast, setting compensation based on providers' submitted, "allowable" costs would be less efficient and more costly for the Commission and providers. As the Commission has recognized, "[r]atemaking based on calculations of allowable costs is inherently a contentious, complicated, and imprecise process."[205] It requires "sufficient oversight" via complex and often labyrinthine accounting requirements.[206] These "systems of accounting and review," which do

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[201] *In re Policy and Rules Concerning Rates for Dominant Carriers*, Report and Order and Second Further Notice of Proposed Rulemaking, 4 FCC Rcd 2873, 2881 ¶ 14 (1989) ("*AT&T Price Cap Order*"); *see also In re Connect America Fund*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, 26 FCC Rcd 4554, 4741 ¶ 597 (2011) ("*2011 NPRM Connect America Fund Order*"); *In re Policy and Rules Concerning Rates for Dominant Carriers*, Second Report and Order, 5 FCC Rcd 6786, 6790 ¶ 29 (1990) ("*LEC Price Cap Order*") ("making the judgment that [price cap] incentive regulation is superior to rate of return" and citing previous Commission order which "contained lengthy discussions of the tendency of rate of return regulation to produce inefficiencies"); *Price Cap Holding Order*, 27 FCC Rcd at 15,758 ¶ 12.

[202] *AT&T Price Cap Order*, 4 FCC Rcd at 2933 ¶ 114; *see also LEC Price Cap Order*, 5 FCC Rcd at 6790 ¶ 29 ("making the judgment that [price cap] incentive regulation is superior to rate of return" and citing previous Commission order which "contained lengthy discussions of the tendency of rate of return regulation to produce inefficiencies"); *Price Cap Holding Order*, 27 FCC Rcd at 15,758 ¶ 12.

[203] *See, e.g.*, *AT&T Price Cap Order*, 4 FCC Rcd at 2877 ¶¶ 3-4 (first in a series of orders adopting price caps in rate regulation of local exchange carriers in order to better approximate the operation of a competitive market); *see also 2011 NPRM Connect America Fund Order*, 26 FCC Rcd at 4741 ¶ 597 ("because both decreases and increases in company costs are passed on to consumers, a rate-of-return regulated carrier has little incentive to manage inputs efficiently"); *AT&T Price Cap Order*, 4 FCC Rcd at 2890 ¶ 30 ("[B]ecause a [regulated entity's] operating expenses generally are recovered from ratepayers on a dollar-for-dollar basis, and do not affect shareholder profits, management has little incentive to conserve on such expenses.").

[204] Connolly Decl. ¶¶ 53-57.

[205] *In re Structure and Practices of the Video Relay Service Program*, Report and Order and Further Notice of Proposed Rulemaking, 28 FCC Rcd 8618, 8706 ¶ 217 (2013), *vacated in part by Sorenson Commc'ns, Inc. v. FCC*, 765 F.3d 37 (D.C. Cir. 2014).

[206] *2011 NPRM Connect America Fund Order*, 26 FCC Rcd at 4741 ¶ 597.

not reflect market forces, can "be burdensome for providers and overseers alike."[207] Indeed, in moving IP CTS rates to the MARS rate methodology in 2007, the Commission touted the fact that doing so would "eliminate[] the costs, burdens, and uncertainties associated with evaluating, correcting, and re-evaluating provider data" on costs.[208]

Moreover, setting rates based on allowable costs "requires the Commission to determine which costs are allowable," which is itself a contentious and drawn-out process, at times involving arbitrary line-drawing.[209] As a result, as Professor Connolly explains, a compensation rate based on average allowable costs leads to "[f]requent petitions and rulings on the reasonableness of costs," a "socially costly activity both because of the resources used in such activities and because of the uncertainty these create for providers."[210] Setting rates based on providers' average allowable costs necessarily entails the risk of regulator error.[211]

Adopting rates based on providers' average allowable costs also skews providers' incentives in inefficient ways. As Professor Connolly explains, "[w]hen providers are faced with decisions to reduce costs, those decisions will be greatly influenced by the portion of the costs-savings that goes towards the bottom line. When reducing costs also sufficiently reduces revenue,

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[207] *Further Notice*, Statement of Commissioner Michael O'Rielly, Approving in Part and Concurring in Part; *see also* Connolly Decl. ¶¶ 30-31.

[208] *2007 TRS Order*, 22 FCC Rcd at 20,150 ¶¶ 17-18.

[209] *Further Notice*, Statement of Commissioner Michael O'Rielly, Approving in Part and Concurring in Part.

[210] Connolly Decl. ¶ 18.

[211] *See, e.g.*, *2017 BDS Order*, 32 FCC Rcd at 3515-16 ¶ 127 (noting the inherent risk that regulation will provide insufficient revenue to market participants); *AT&T Price Cap Order*, 4 FCC Rcd at 2890 ¶ 31 ("[A]dministering rate of return regulation . . . is a difficult and complex process . . . . [S]uch regulation is built on the premise that a regulator can determine accurately what costs are necessary to deliver service. In practice, however, a regulator may have difficulty obtaining accurate cost information . . . . Furthermore, no regulator has the resources to review in detail the thousands of individual business judgments a [regulated company] makes before it decides, for example, to install a new [technical] system.").

it is not rational to expect providers to reduce costs. As Professor Connolly explains, "[t]his fact remains true whether rates are based on marginal or average costs."[212] The "distortions created by submitted cost-based compensation" will "raise production costs," which, according to Professor Connolly, "also raise the burden on the TRS fund."[213]

B. The Commission Should Set the Initial Rate at $1.75 Per Minute.

Setting the initial price cap rate correctly is an important part of ensuring that a price cap incentivizes providers to invest in innovation and become more efficient. Professor Connolly explains that if the price cap is set too low, it will lead to forced exit (or non-entry) of otherwise efficient and competitive providers, reducing the quality and quantity of service provided to consumers.[214] Moreover, ensuring that the initial rate is not set too low is particularly important for services such as IP CTS that are undergoing a period of technological change. If the rate is set too low, providers might have to forgo the development of new technologies, like further mobile and web-based applications, and the incorporation of ASR. This result would be contrary to the ADA,[215] as well as the Commission's objectives in this proceeding.[216] Thus, as Professor Connolly observes, a rate that is too low could irreversibly harm the market, force competitors to

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[212] Connolly Decl. ¶ 28 (quotation marks omitted).

[213] Connolly Decl. ¶ 39.

[214] Connolly Decl. ¶¶ 6, 73.

[215] 47 U.S.C. § 225(d)(2) (prohibiting the Commission's TRS rules from "discourage[ing] or impair[ing] the development of improved technology").

[216] *Further Notice* ¶ 52; *see also CaptionCall 5-29-18 Ex Parte* at 3-4 (noting goals of fostering investment and innovation, and permitting ASR to develop as an alternative to CA-assisted IP CTS); *see also* Comments of CaptionCall, LLC at 4, CG Docket Nos. 03-123, 10-51, 13-24 (May 29, 2018); Letter from John Nakahata, Counsel to CaptionCall, LLC to Marlene Dortch, Secretary, Federal Communications Commission at 2, CG Docket Nos. 03-123, 13-24 (Sept. 7, 2017) ("*9-7-17 CaptionCall Ex Parte*") (encouraging Commission to "consider ways to encourage IP CTS providers to make the necessary investments to improve ASR so it is capable of enabling users to have functionally equivalent conversations").

exit (as occurred in IP Relay), and delay or even stymie innovations.[217] As discussed below, a rate of $1.75 per minute will ensure that providers are able to continue to make capital investments in innovation and efficiency, and that the IP CTS market remains competitive. In contrast, the proposed second-year rate of $1.58 per minute fails to meet these goals and could hinder competition and innovation.

Setting the price cap at a starting rate of $1.75 per minute would further the Commission's and the ADA's goal of fostering innovation in the IP CTS market, and ensure that a sufficient number of providers remain in the market to support robust competition. Although remaining competitive at a rate of $1.75 would be challenging for some existing IP CTS providers,[218] providers have nonetheless stated their ability to remain in the market at that rate.[219]

Correcting the Rolka Loube calculation of average costs would provide further support for an initial price cap of $1.75. As explained below, the Commission's position on providers' average costs is derived from Rolka Loube's flawed calculation. Specifically, the Commission relies on Rolka Loube's incorrect exclusion of CaptionCall's IP licensing costs, despite the fact that it

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[217] Connolly Decl. ¶ 73 n.41.

[218] *See, e.g.*, Letter from David A. O'Connor, Counsel for Hamilton Relay, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123, at 3 (May 24, 2018) ("*5-24-18 Hamilton Relay Ex Parte*") (stating that an "arbitrary 10% cut [to $1.75] is very difficult for any industry to manage, especially in the situation given the very short nature in which this particular change will take place"); Letter from Paul C. Besozzi, Counsel for ClearCaptions, LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123, at 2 (May 18, 2018) ("ClearCaptions gave its opinion that a 10% reduction from the current [MARS] rate to the Rolka Loube proposed rate of $1.752 would negatively impact competition and impact the ability for smaller IP CTS providers to invest in new technology . . . ." (footnote omitted)).

[219] *See, e.g.*, *5-24-18 Hamilton Relay Ex Parte*, at 4 (urging the Commission to "establish a two-year interim rate of $1.75 per minute"); Letter from Paul C. Besozzi, Counsel for Clear Captions, LLC., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123 Att. 1, at 4 (May 25, 2018) (acknowledging that a rate of $1.75 in two years would "enable ClearCaptions to continue to position itself as an alternative to the other providers").

treated other providers' licensing costs as allowable and included these costs in its average.[220] Were the Commission to correct the Fund Administrator's error and treat all providers' costs uniformly, the average allowable costs would be **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION: :END HIGHLY CONFIDENTIAL INFORMATION]]**.[221] In the *Further Notice*, the Commission proposed applying a reasonable operating margin of between 7.6 and 12.35 percent.[222] Applying that range of operating margins to a base average allowable cost of **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION: :END HIGHLY CONFIDENTIAL INFORMATION]]** yields rates in the range of **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION: :END HIGHLY CONFIDENTIAL INFORMATION]]**. An initial price cap rate of $1.75, therefore, would be on the lower end of the range of potential reasonable rates.

By contrast, setting the initial price cap lower than $1.75, such as at the second year interim rate of $1.58, could be problematic for several reasons. Other IP CTS providers have highlighted concerns with setting rates that are too low.[223] For example, Sprint recently explained that "[t]he

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[220] *See infra* Part VI.E.2. *See, e.g., 9-7-17 CaptionCall Ex Parte* at 3 n.8 [REDACTED]; Sorenson Communications, LLC Comments on Rolka Loube Payment Formulas and Funding Requirements at 5-6, CG Docket Nos. 13-24, 03-123 (May 24, 2018).

[221] *See* Connolly Decl. ¶¶ 51-53 (discussing importance of uniform treatment of allowable costs); *id.* at Appendix A.

[222] *See Further Notice* ¶ 82.

[223] *See 5-24-18 Hamilton Relay Ex Parte* at 4 (stating that "an additional rate cut to $1.58 per minute, as proposed in the draft item, would create serious market disruption and likely would adversely affect quality and availability of service"); Letter from Scott Freiermuth, Counsel for Sprint Corp., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 13-123 (June 1, 2018) (stating that "an interim, reduced rate could be highly disruptive to both providers and users of IP CTS," arguing "that the IP Relay market collapsed through similar regulatory interdiction and encourage[ing] the Commission to heed the lessons of history"); *see also* Letter from David A. O'Connor, Counsel for Hamilton Relay, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123 (June 1, 2018); Letter from David A. O'Connor,

likely result of setting an inadequate interim rate for IP CTS service will be that fewer IP CTS providers will continue to offer service."[224] Hamilton has likewise noted that rates that are too low may force some providers to exit the market, and also argued that diminished competition "will likely result in an overall reduction in [service] quality."[225] As Hamilton notes, setting rates too low also affects service quality for another reason: "[I]nsofar as quality service is costly to provide, a reduction in the reimbursement rate may increase pressure to reduce service quality in order to cut costs."[226] Indeed, Hamilton explained, "drastic and immediate reductions in [service] quality may be necessary for some providers to remain viable" under either of the Commission's interim rates.[227]

A lower price cap rate, such as $1.58 per minute, could discourage innovation, impair the development of improved technology, and—accordingly—frustrate the Commission's statutory mandate, which requires that the Commission adopt regulations that "do not discourage or impair the development of improved technology."[228] In addition, the decision would be arbitrary.[229] Indeed, the Commission selected a rate of $1.58 based on an arbitrary 10 percent reduction from

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Counsel for Hamilton Relay, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123 (May 30, 2018).

[224] *See* Sprint Corporation, Petition for Reconsideration 15, CG Docket Nos. 13-24, 03-123 (July 27, 2018).

[225] Comments of Hamilton Relay, Inc. at 4, CG Docket Nos. 13-24, 03-123 (Sept. 7, 2018) ("9-7-18 Comments of Hamilton Relay").

[226] 9-7-18 Comments of Hamilton Relay at 4.

[227] 9-7-18 Comments of Hamilton Relay at 4.

[228] *See* 47 U.S.C. § 225(d)(2); *CaptionCall 5-29-18 Ex Parte* at 4; *cf.* 9-7-18 Comments of Hamilton Relay at 5 (arguing that rate of $1.75 is already low enough to "imperil" innovation).

[229] *See CaptionCall PFR Comments*, at 15-16 (discussing arbitrariness of 10 percent figure); 9-7-18 Comments of Hamilton Relay at 7-8 (discussing Commission's unwarranted assumption that divergence in scale of CTS and IP CTS is indicative of "a substantial divergence in cost").

$1.75, combined with an assertion that $1.58 would still be above costs.[230] Any other rate the Commission arbitrarily selects would suffer from the same deficiency.[231]

C. The Initial Price Cap Period Should Be Between Three and Five Years.

The Commission seeks comment on setting the IP CTS rate for a "multi-year" period.[232] Consistent with Professor Connolly's recommendation, a three-to-five-year initial price cap period would offer providers sufficient certainty and incentives to invest, while also allowing the Commission to either review the X-Factor after the initial period or conduct an auction.[233]

First, a three-to-five-year initial price cap period avoids the significant and inefficient cost-reporting burdens that accompany annual ratemaking proceedings.[234]

Second, as the Commission has repeatedly recognized, a price cap is most effective at encouraging investment and innovation when it affords providers with sufficient stability and business certainty to enable investment.[235] A three-to-five year initial price cap period can achieve

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[230] *See CaptionCall PFR Comments* at 15-16.

[231] Indeed, as Sprint and CaptionCall have argued, even the second-year interim rate of $1.58 is arbitrary, because it lacks any support in the record.

[232] *Further Notice* ¶ 70.

[233] Connolly Decl. ¶ 74. CaptionCall uses the term "initial price cap period" to refer to the proposed three-to-five year period during which a rate cap would be in place, prior to any adjustment to the X-factor or switch to an auction-based methodology.

[234] *See* Part VI.A *supra*; *see* generally *AT&T Price Cap Order*, 4 FCC Rcd at 2893 ¶ 36 (price cap regulation "is less complex than rate of return regulation and easier to administer in the long run, which should reduce the cost of regulation").

[235] *See In re Structure and Practices of the Video Relay Serv. Program*, Report and Order and Order, 32 FCC Rcd 5891, 5921 ¶ 58 (2017) ("*2017 VRS Order*") (adopting a four-year rate period because it would give "providers' certainty regarding the future applicable rate").

the same benefits as a multi-year rate by providing "consistency that is necessary for planning and budgeting purposes, and avoid[ing] having to possibly adjust on short notice to a lower rate."[236]

To be clear, under a price-cap methodology, the rate could be adjusted each year. A price cap formula generally has three components: an inflation adjustment (historically GDP-PI), an X-factor to account for productivity, and a provision for treatment of exogenous costs. If X is set equal to the change in GDP-PI, then the nominal rate does not change, although the real rate would be lowered due to the effect of inflation. In setting an initial price cap rate for IP CTS, CaptionCall suggests setting X equal to the change in GDP-PI and applying the price cap formula annually to establish the following year's rate.[237] Thus, although the rate could be adjusted each year, the adjustments would occur in a predictable and incremental way.

This approach would allow providers to have certainty about what their compensation will be for a sustained period of time. This certainty is precisely what is required for providers to sign long-term contracts for the facilities (such as office space and telecommunications facilities) necessary to provide IP CTS service; make hiring decisions; and make long-term investments in new technologies. Business certainty is particularly important for investments in new technologies like ASR—investments that have a long time horizon and the success of which is uncertain.

A three-to-five year duration would also be consistent with Commission precedent: The Commission has previously adopted rates for periods of four to five years in the TRS context.[238]

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[236] *See 2007 TRS Order*, 33 FCC Rcd at 20,164 ¶ 56 (adopting a three-year period for VRS tiered rates).

[237] Although CaptionCall does not foresee any exogenous costs that would warrant any adjustments of the X-Factor, IP CTS providers should be afforded the opportunity to make a showing that exogenous cost treatment is warranted.

[238] *See, e.g.*, *Access Charge Reform Order*, 15 FCC Rcd 12,962 (adopting five-year price cap, which has been effectively extended indefinitely); *2017 VRS Order*, 32 FCC Rcd at 5921 ¶ 58 (imposing a rate period of four years to VRS); *see also* Connolly Decl. ¶ 43 (noting that state price-cap regulation plans adopted around the turn of the century "implemented fairly long time periods between reviews (often 4 or 5 years)" (quoting Sappington & Weisman, *Price*

Indeed, just last year, the Commission found that "[a] four-year period is long enough to offer a substantial degree of rate stability, thereby (1) giving providers certainty regarding the future applicable rate, [and] (2) providing [a] significant incentive for providers to become more efficient without incurring a penalty . . . ."[239] Here, too, a three-to-five-year initial price cap period will ensure that providers have sufficient business certainty and the profit incentive to invest in innovation and efficiency.[240]

D. The Commission Could Revisit the X-Factor or Conduct a Reverse Auction to Set IP CTS Rates for Subsequent Rate Periods.

After the conclusion of the first three-to-five year price cap period, the Commission could adjust the X-Factor to better account for these changes, or the Commission could set rates based on a reverse auction, as discussed below.[241]

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cap regulation: what have we learned from 25 years of experience in the telecommunications industry?, 38 J. of Reg. Econ. 227, 233-34 (2010).

[239] *See 2017 VRS Order*, 32 FCC Rcd at 5921 ¶ 58.

[240] During the initial rate period, CaptionCall supports an X-Factor that is equal to the inflation rate or to the inflation rate less 0.5 percent, which is the X-Factor the Commission adopted when it initially adopted price cap regulation for VRS and IP Relay. *See 2007 TRS Order*, 22 FCC Rcd at 20,159-60 ¶ 43 ("The Efficiency Factor will be set as a figure equal to the Inflation Factor, less 0.5 percent (or 0.005) to account for productivity gains.").

[241] Connolly Decl. ¶ 65. The Commission should not reinitialize the price cap rate for IP CTS based on providers' reported allowable costs, as determined by the Fund Administrator. Connolly Decl. ¶ 72; *see Further Notice* ¶¶ 70, 85-86. As Professor Connolly explains, any rate structure in which compensation changes over time in response to changes in providers' average allowable costs is inherently flawed, and effectively retains and recreates the perverse incentives of rate-of-return regulation. *See* Connolly Decl. ¶ 74 (were the Commission to "reassess the X factor (or reinitialize the rate) more frequently[than every three to five years] based on observed innovations, price cap regulation would end up replicating the negative impact of cost-based compensation with respect to efficiency, innovation, and administrative burdens"); *see also id.* ¶¶ 21-43 (discussing problems with cost-based compensation). Reinitializing the price cap rate based on providers' reported costs would also impose significant administrative costs on the Commission and on providers. *See* Part VI.A *supra*.

1. At the End of the First Rate Period, the Commission Could Open the Record to Reset the X-Factor for the Rate Cap.

Under typical price cap regulation, the X-Factor is fixed for a rate period and then reevaluated at the "next scheduled review date."[242] Specifically, as Professor Connolly notes, toward the end of the first rate period, the Commission could seek comment to determine "the [then] appropriate indices to use to reflect inflation and productivity."[243] The Commission's *2017 BDS Order* provides a template for how to reset the X-Factor for IP CTS at the end of the first rate period: the "total factor productivity (or TFP) growth rate," which is the "relationship between the output of goods and services to inputs, and is commonly used to measure productivity in the economy as a whole."[244] In the *2017 BDS Order*, the Commission relied on the U.S. Bureau of Labor Statistics' Capital, Labor, Energy, Materials, and Services data for the broadcasting and telecommunications industries data set. But the Commission also requested comment on other potential datasets, and invited parties "to suggest adjustments to these datasets that might improve their utility as a measure of . . . productivity growth [for the regulated services" or to "suggest additional datasets that might better balance precision with administrative feasibility."[245] The Commission could take a similar approach—starting from publicly available datasets and then inviting adjustments from providers—for IP CTS.

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[242] Connolly Decl. ¶ 67.

[243] *Further Notice* ¶ 92.

[244] *2017 BDS Order*, 32 FCC Rcd at 3546 ¶ 205 (footnote omitted).

[245] *2017 BDS Order*, 32 FCC Rcd at 3547 ¶¶ 208-209.

2. Alternatively, at the End of the First Rate Period, the Commission Could Conduct a Reverse Auction to Set the Rate for IP CTS.

The initial three-to-five year rate period would also give the Commission the time it needs to design an appropriate reverse auction to set IP CTS rates in the future.[246] While the Commission has not yet used an auction in the TRS context, a properly structured reverse auction to set IP CTS rates would be consistent with the Commission's previous determinations that auctions are an effective mechanism to reflect market-based forces. For instance, in adopting the framework for the Connect America Fund Phase II Auction, the Commission recognized that "a reverse auction is the best way to achieve our overall objective of maximizing consumer benefits given the available funds."[247] The Commission used a reverse auction "to identify those providers that will make most effective use of the budgeted funds, thereby extending services to as many consumers as possible."[248] And Commissioner O'Rielly has affirmatively suggested "that the Commission explore the use of a reverse auction in lieu of rate regulation" here.[249]

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[246] *Further Notice* ¶ 95 (seeking comment on alternative market-based approaches and asking participants to consider whether "holding a reverse auction to set a multi-year compensation rate for IP CTS" could be a workable approach); *see also* Sorenson 2017 TRS Rate Filing Comments at 6.

[247] *In re Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17,663, 17,781 ¶ 322 (2011) ("*2011 Connect America Fund*"); *see also In re Connect America Fund; Universal Service Reform - Mobility Fund*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152, 2158 ¶ 18 (2017) (adopting nationwide reverse auction and finding that this "auction provides a straightforward means of identifying those providers that are willing to provide 4G LTE service at the lowest cost to the budget, targeting support to prioritized areas, and determining support levels that awardees are willing to accept in exchange for the obligations the Commission imposes"); *see also* Connolly Decl. ¶¶ 63-64 (discussing benefits of reverse auction to set IP CTS rates); *id.* ¶ 79 (a reverse auction "would allow the FCC to set a non-biasing single compensation rate with improved social outcomes relative to cost-based compensation").

[248] *2011 Connect America Fund*, 26 FCC Rcd 18,070 ¶ 1122; *see also In re Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6570 ¶ 2 (2014) (in the broadcast television spectrum context, opining that auction would "allow market forces to determine [that resource's] highest and best use" and accurately reflect "the economics of demand").

[249] Statement of Commissioner Michael O'Rielly Approving in Part and Concurring in Part at 98.

The attached declaration of Professor Andrzej Skrzypacz, the Theodore J. Kreps Professor of Economics at Stanford University's Graduate School of Business, explains that a well-designed reverse auction may be an effective market-based approach to setting IP CTS rates in the future.[250] Professor Skrzypacz proposes an auction that not only encourages providers to bid down the per-minute rate but also maintains and encourages competition among IP CTS providers and produces multiple winners, thereby maintaining and preserving consumer choice.[251] In particular, the proposed auction would reward low-bidding IP CTS providers with the right to add new users and be compensated for those users' minutes through the TRS Fund. Doing so would create a substantial economic incentive for providers to compete in the auction. Because the population eligible to use IP CTS continues to grow, the potential to win *new* customers is a particularly strong incentive in this context.[252]

A reverse auction, as outlined by Professor Skrzypacz, would be consistent with the statutory mandate and with the Commission's goals.[253] The competitive bidding process would result in a market-based rate for new IP CTS customers, and create strong incentives for providers

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[250] Professor Skrzypacz's Declaration is attached as Appendix D. If the Commission believes an auction after the initial price cap is the right approach, the attached auction design is flexible and could be adjusted to accommodate different changes. CaptionCall is happy to engage with the Commission to discuss potential options should the Commission decide to pursue this approach.

[251] *See id.*

[252] *See* Part III.A *supra.*

[253] *See, e.g., Further Notice* ¶ 70 (seeking to "provide incentives for providers to increase their efficiency through innovation and cost-reduction"); *id.* ¶ 94 (seeking to "encourages higher-cost providers to become more efficient"); 47 U.S.C. § 225(b)(1), (d)(2) (Commission must make functionally equivalent TRS available in "the most efficient manner" and not "discourage or impair the development of improved technology.").

to pursue efficiencies and cost-saving innovations on an ongoing basis.[254] By setting rigorous quality controls, as described below, a reverse auction would also create positive incentives with regard to service quality.[255]

Professor Skrzypacz's declaration sets forth the following parameters, and describes the proposed auction design in detail:

- *Auction Participants*: To qualify, providers must demonstrate the ability to meet minimum scale and quality standards.

- *Timing*: The auction would occur annually. (Although the Commission could hold auctions at a different interval, such as every 18 or 24 months, holding an auction no more frequently than once per year will strike the right balance between avoiding unnecessary business disruptions and maintaining a competitive market.)

- *Winning Bidders*: Winners will receive the right to acquire new IP CTS customers and be compensated from the TRS Fund for new users' minutes from that time until the conclusion of the next auction cycle.

- *Bidding*: Bidding will start at a reserve price, and participants will not know the number of other bidders or the amounts of other providers' bids. The reserve price will be incrementally decreased until all but one bidder drops out.

- *Rate*: The winning rate will be determined by the bids in the round before the auction closes (*e.g.*, the *second* lowest bid). In other words, the rate will be the lowest price at which more than one participant was still bidding.

- *Winning Bidders*: The bidders who were still active at the end of the round prior to the closing round will automatically be winners. Any other bidders who were still active in the auction when the rate was within X% (*e.g.*, 5%) of the winning rate will also become winners. This encourages competition and ensures choice for consumers.

- *Losing Bidders*: Losing bidders will not be able to receive compensation from the TRS Fund for any services they provide to new customers during the relevant auction cycle.

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[254] *See* Part VI.A *supra*; *see also 2007 TRS Order*, 22 FCC Rcd at 20,151, 20,153 ¶¶ 20, 25 (noting, with respect to competitively bid state rates, "[t]he competitive bidding process necessarily encourages providers to minimize costs and increase productivity" (quotation marks omitted)).

[255] *See, e.g.*, *Further Notice* ¶ 89 (asking how methodology would "affect provider incentives to operate more efficiently, improve service quality, or invest in new technology, such as ASR").

- *Small Providers and New Entrants*: In order to avoid creating a barrier to entry, new market entrants and smaller providers that do not have capacity to handle a sufficient amount of customers to participate in the auction will be treated as winners. This means that these providers may be compensated at the winning rate for their new customers' minutes.

- *Preexisting Customers*: The auction will only affect provision of service to *new* IP CTS customers. All providers will be allowed to continue serving their existing customers at the winning rate, regardless of whether or not they are winning bidders. (This design feature will allow losing bidders to remain in the market, but will still provide strong economic incentives to compete in the auction.)[256]

Consistent with Commission precedent, a fair and efficient auction requires robust qualification standards. For example, in developing the framework for a reverse auction in the universal service fund context, the Commission noted that, because underlying funding comes from "American businesses and consumers," "vigorous ongoing oversight by the Commission" is critical.[257] Likewise, the Commission emphasized the need to "[r]equire accountability from companies receiving support to ensure that public investments are used wisely to deliver intended results."[258] The same considerations apply here: The TRS Fund fees are ultimately borne by consumers.

Rigorous upfront review of providers is also necessary to ensure that individuals with hearing loss are not denied access to functionally equivalent service by telephone, as guaranteed by the ADA. Only qualified bidders should be permitted to participate in auctions to provide IP CTS. Absent robust provider screens, non-certified providers might enter and win the auction,

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[256] Professor Skrzypacz recommends phasing in the new rate gradually over time to "provide some insurance to existing providers and to the Fund" and to "reduce the risk of losing bidders being driven out of business as the result of one auction with extreme results." Skrzypacz Decl. at 7.

[257] *See, e.g., 2011 Connect America Fund*, 26 FCC Rcd at 17,484-49 ¶ 568.

[258] *See, e.g., 2011 Connect America Fund*, 26 FCC Rcd at 17,670-71 ¶ 11.

then prove unable to provide quality service at the scale necessary to comply with the ADA's mandate. Accordingly, if the Commission implements an auction, it should at the very least require that all potential auction participants meet the following requirements, which are consistent with the interim certification standards recently advanced by a number of consumer groups:[259]

(1) The bidder must be certified or conditionally certified as an IP CTS provider, pursuant to the process set forth in 47 C.F.R § 64.606.

(2) In connection with its application for certification, the bidder must demonstrate that it is able and available to handle "all types of calls," including calls involving all types of speakers, in all types of environments, and in all types of calling scenarios.[260] The bidder also must demonstrate the capacity to handle all types of calls at the scale necessary to serve a minimum number of customers.[261]

(3) The bidder must demonstrate that "[its] services support 911 emergency calling and meet applicable call handling requirements."[262] Additionally the bidder should be required to "demonstrate conclusively that consumers who utilize [its] services in

[259] Letter from Blake E. Reid, Counsel for Telecommunications for the Deaf and Hard of Hearing, Inc., to Marlene Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123 at 5 (July 26, 2018) ("*Consumer Groups' Certification Framework*").

[260] *See, e.g.*, *Consumer Groups Certification Framework* at 6 ("The Commission should carefully implement the . . . requirement that providers demonstrate they can handle 'all types of calls' by requiring demonstrated proof from all applicants of the ability to handle calls involving male and female speakers, children, speakers who heavily use industry-specific jargon, speakers with thick accents, and speakers who speak at different rates, volumes, and with varying reliance on idiomatic language." (footnote omitted)); *see also id.* (describing additional call scenarios, environments, and concerns that providers must demonstrate the ability to handle in order to satisfy mandatory minima).

[261] *See Consumer Groups' Certification Framework* at 3-6 (discussing importance of ensuring that providers can respond to all types of calls and callers at scale); *CaptionCall PFR Comments* at 5-10 (same).

[262] *Further Notice* ¶ 60 & n.208.

emergency situations will be able to rely on the transcription of a 911 call-taker's questions and instructions to make life-and-death decisions."[263]

(4) The bidder must demonstrate that it can provide quality service in "times of high demand," and that "[its] services perform[] effectively across different types of equipment, wiring, and network conditions."[264]

(5) The bidder must show that it has been providing IP CTS compensated by the TRS Fund for at least 2 years. Note that because new and small providers would be treated the same as winners without participating in the auction, this does not create a barrier to entry.

(6) The provider must agree to comply with any reporting, audit, and record retention requirements the Commission may impose.

In short, a well-structured reverse auction, with rigorous entry criteria as described above, could be a fair and functional approach to rate-setting, by encouraging competition, setting the right incentives, and effectively approximating market-based rates. Moreover, utilizing an auction methodology after the conclusion of the initial rate period would be consistent with the Commission's dedication to using market-based mechanisms to foster competition—and would represent an exciting new approach to compensation for TRS.

[263] *Consumer Groups' Certification Framework* at 5.

[264] *Consumer Groups' Certification Framework* at 5.

E. The Commission Should Treat All IP CTS Providers Uniformly.

1. The IP CTS Per-Minute Rate Cap Should Be Uniform, Regardless of the IP CTS Provider or Technology.

Regardless of the rate methodology, it is critical that the Commission adopt a uniform rate for all providers. A uniform rate reduces the complexity and administrative burden of adopting either different rates for each provider or tiered rates. But more importantly, a uniform rate "reasonably places pressure on higher-cost providers to reduce costs," thereby satisfying the Commission's "statutory mandate to make TRS available in the most efficient manner."[265] To the extent that the Commission's uniform rate is generally less than the costs of the highest-cost provider, those providers with costs above the compensation rate must increase their efficiency or exit the market.[266] Lower-cost providers are likewise incentivized to continue to innovate and reduce costs in order to maximize short-term profits.[267]

For these reasons, as noted in the *Further Notice*, the Commission's "traditional approach has been to set TRS compensation based on a single, generally applicable rate."[268] Prior to 2007, all forms of TRS were generally compensated at a single rate based on a weighted average of the providers' projected minutes and costs.[269] In 2007, the Commission adopted the MARS Plan for several forms of TRS service, including IP CTS, and adopted a price-cap approach for IP Relay

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[265] *See Further Notice* ¶ 31.

[266] By contrast, as explained in greater detail below, modifying higher-cost providers' compensation to match their higher costs ultimately excuses or even encourages those providers' inefficiencies.

[267] A single, uniform compensation rate has the added benefit of being neutral with respect to the provider's underlying business model or use of particular technologies, so that the Commission is not put in the position of having to pick winners and losers among innovative technologies. *See* Part VI.E.1.b *infra.*

[268] *See Further Notice* ¶ 31.

[269] *2007 TRS Order*, 22 FCC Rcd at 20,150 ¶ 17 (emphases removed).

service.[270] But the Commission still imposed a uniform compensation rate for all providers of each service.[271] The MARS Plan, for example, imposed "a weighted average of competitively bid state rates" on all providers.[272] Thus, for the past 15 years, IP CTS (like some other TRS) has been compensated based on a uniform rate applicable to all providers of each service. The Commission should continue that approach.[273]

a. The Commission Should Not Adopt Tiered Rates for Smaller Providers or New Market Entrants.

The Commission should not adopt tiered rates, as such a rate structure fails to replicate the conditions that would exist in a competitive market. Indeed, as Professor Connolly explains, tiered rates *shelter* high-cost providers, whereas in a market without rate regulation, "all firms that provide the same undifferentiated service face the same market pressures."[274] Nor are there "unique factors . . . present in the IP CTS market" that would require the use of a tiered rate structure, or an "emergent provider" rate, in the future.[275] *First*, there is no single dominant IP CTS provider. Instead, there are multiple large providers with substantial market shares and similar cost structures.[276]

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[270] *2007 TRS Order*, 22 FCC Rcd at 20,149-60 ¶¶ 16-46.

[271] *2007 TRS Order*, 22 FCC Rcd at 20,149-60 ¶¶ 16-46.

[272] *2007 TRS Order*, 22 FCC Rcd at 20,149-50 ¶ 16.

[273] The one exception has been the Commission's treatment of VRS compensation. In that market, and only in that market, the Commission has adopted "tiered" rates, which are structured such that providers of different sizes receive different blended-average rates for their overall service. *See 2007 TRS Order*, 22 FCC Rcd at 20,160-65 ¶¶ 47-56 (describing tiers as of 2007); *2017 VRS Order*, 32 FCC Rcd at 5916-24 ¶¶ 49-64 (describing tiers as of 2017). As discussed below, however, tiered rates, if ever appropriate, are particularly ill suited for IP CTS.

[274] *See* Connolly Decl. ¶ 44; *id.* at ¶ 46 (noting that the same issue arises with respect to an "emergent" provider rate, which is just another form of tiered rate).

[275] *Further Notice* ¶¶ 89-90.

[276] *See In re Telecommunications Relay Services and Speech to Speech Services for Individuals with Hearing and Speech Disabilities*, CG Docket Nos. 03-123, 10-51, Interstate Telecommunications Relay Service Fund Payment

Second, rate tiers lower providers' compensation as their volume of minutes increases. The premise of such a structure is that providers' costs decrease as their volume increases. But that is not true in the IP CTS market. For example, **[[BEGIN HIGHLY CONFIDENTIAL INFORMATION:** [redacted] **:END HIGHLY CONFIDENTIAL INFORMATION]]**[279] There is little correlation between volume of minutes served and costs, and the Commission accordingly should not use tiers with volume serving as a proxy for costs when setting rates.

Third, IP CTS is not dependent on interoperability and does not have other network effects that make it difficult for new entities to enter. Because consumers need to acquire only a new handset (which is available at no cost) or download an app from another provider, switching costs are low. Moreover, market entry remains a realistic prospect even absent tiered rates because only a small fraction of the total population of eligible IP CTS users is currently being served, and that population is continuing to grow.[280]

Formula and Fund Size Estimate, Ex. 1-3.1 (Apr. 30, 2018) ("*Fund Administrator's Report*") (identifying the market shares of the various IP CTS providers) .

[277] Connolly Decl. at Appendix A, ¶ 16.

[278] Connolly Decl. at Appendix A, ¶ 15.

[279] Connolly Decl. at Appendix A, tbls. 2 & 3.

[280] *See* Part III.A *supra.*

Fourth, the history of IP CTS confirms that tiers are unnecessary to help new entrants. Over the past several years, new entrants *have* entered the IP CTS market even without regulatory protection. Whereas Sprint and Hamilton were once the only providers of IP CTS, CaptionCall and other providers have since begun to offer this service and gained considerable market share since entry.[281] CaptionCall has gained market share by successfully competing in non-price dimensions. Tiered rates assume that new or smaller providers require a compensation scheme biased in their favor to get to scale. But as these examples demonstrate, they do not.[282] There is no reason that smaller and newer IP CTS providers cannot do the same thing that CaptionCall did or that start-up companies in unregulated industries must do.

b. The Same Per-Minute Rate Cap Should Apply to All Forms of IP CTS.

The Commission seeks comment on setting a compensation rate for IP CTS providers that use ASR in captioning calls.[283] CaptionCall supports the Commission's effort to develop a rate environment that facilitates greater use of ASR, but urges the Commission to reject the Fund Administrator's recommended rate of $0.49 per minute for ASR and instead adopt a uniform price cap of $1.75 for all IP CTS calls. A single, technology-neutral rate will create incentives for existing and prospective providers to begin offering ASR-based IP CTS, while promoting long-term efficiency gains and assuring that the IP CTS program remains administrable. The Fund

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281 *See* Letter from John T. Nakahata, Counsel for CaptionCall, LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 03-123, at 1 (Sept. 19, 2017).

282 *See* Connolly Decl. ¶¶ 43-40, Appendix A.

283 *Further Notice* ¶¶ 96-100.

Administrator's recommendation of a different and much lower rate for ASR-only calls[284] should be rejected for two reasons: (1) this rate does not create incentives that will encourage at-scale providers to develop and use ASR, and (2) the Fund Administrator did not use reliable data or a sound methodology in arriving at the recommended rate.[285]

1) A Lower ASR Rate Would Set the Wrong Incentives to Facilitate a Transition to Greater Reliance on ASR.

To encourage providers to transition to ASR when the service is able to meet the Commission's standards and criteria, it is important that the Commission establish strong incentives for *currently certified* IP CTS providers to begin incorporating ASR into their service.[286] That is so because currently certified providers handle a substantial volume of minutes and because new entrants will likely take time to scale, and may not be able to handle all types of calls. Thus, focusing on currently certified providers, along with new entrants, is a more efficient and expeditious approach to promoting the use of ASR to handle more IP CTS minutes. This will lead to faster savings for the TRS Fund than relying on new entrants alone. In this regard, the Fund Administrator's recommendation that the Commission set a specific rate for ASR-exclusive service will delay, rather than expedite, the transition to ASR. The recommended rate is well

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[284] *Further Notice* ¶ 98. It does not appear that the Fund Administrator proposes that its recommended rate be applied to providers that rely on both ASR and human intervention or "hybrid" services. *See Fund Administrator's Report* at 24 (focusing on service providers that purportedly will not use CAs to service calls). To the extent the Fund Administrator intends that its recommended rate apply to such hybrid services, it supplies no reasoning for doing so. *Id.* at 24 (making no mention of hybrid services and offering no analysis of appropriate rate for such services).

[285] Neither of these issues is addressed in the recent filing by T-Meeting. *See* Comment on Sprint Petitions Regarding the Report and Order and Declaratory Ruling on Internet Protocol Captioned Telephone Service, CG Docket Nos. 03-123, 13-24 (Aug. 30, 2018). T-Meeting's conclusory suggestion that the Fund Administrator's Recommendation is "fair" is unsupported by evidence or argument and should be rejected.

[286] Providers transitioning from CA-assisted to ASR-exclusive services, where appropriate, may find it beneficial to develop hybrid models that involve the use of CAs and of ASR. Indeed, this hybrid approach might enable providers that currently rely on CAs to integrate ASR into current service offerings more rapidly and without compromising the user experience.

below the rate applicable to services that use CAs and, as a result, may not provide existing providers with an adequate operating margin.

Rather than adopting the Fund Administrator's misguided rate recommendation, the Commission should adopt a single rate that is applicable to all forms of IP CTS. This approach, which is neutral with respect to the technology used to generate captions and is reflected in the Commission's interim rates, is appropriate for several reasons.

First, compensating ASR providers at the proposed initial price cap rate of $1.75 per minute would deliver important advantages that are discussed above and are consistent with the Commission's objectives, namely, mimicking incentives to reduce costs that are imposed by a competitive market and ensuring that the market supports enough providers to preserve competition.[287]

Second, applying this same rate to services that incorporate ASR—whether exclusively or in conjunction with CAs—will incentivize existing providers to make use of ASR and prospective providers to enter the market. If the cost of providing a service that uses ASR is lower than the cost of providing a service that relies entirely on CAs—as both the Commission and Fund Administrator appear to believe will be the case once ASR is ready[288]—compensating all providers at the same rate will provide an incentive to transition to ASR.

Third, compensating all IP CTS providers at the same rate will avoid unnecessary regulations and administrative costs. For example, the Commission's *Further Notice* contemplates

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[287] Pursuing these outcomes through a single uniform rate is appropriate because ASR providers do not face significant barriers to entry and do not face a market-dominant firm. *See supra* Part VI.E.1.a. Moreover, there is no evidence that new providers in the IP CTS market require biased rates to scale, *see id.*, and (as set forth below) a single uniform rate will create important incentives for existing providers to begin offering services that use ASR.

[288] *See Further Notice* ¶ 50; *Fund Administrator's Report at* 24.

that providers may develop hybrid systems that integrate automated and human captioning.[289] Adopting a uniform rate would ensure that, in the event the Commission approves hybrid forms of IP CTS, providers earn equal compensation no matter how a call is serviced. This would eliminate the need for regulations concerning when providers might use a particular captioning method to generate captions for a call, when providers might permissibly switch the captioning method used to generate captions during a call, and any performance measures specific to facilitating an in-call transition between captioning methods. A uniform rate would also obviate any risk of misreporting and any need to expend Commission resources to police provider decisions about whether to deploy CAs or ASR for a specific call. Put another way, adopting a uniform rate will make it unnecessary to engage in expensive compliance, monitoring, and enforcement efforts, allowing the Commission and providers to reduce costs.

Finally, adopting a uniform and technology-neutral compensation scheme would allow providers to optimize their provision of service by affording them flexibility. This flexibility would allow each provider to determine, among other things, whether to pursue fully automated or hybrid IP CTS, how best to time and stage their implementation of fully automated or hybrid IP CTS, and which service is best suited for different callers or types of calls. In short, a uniform rate will empower providers to customize their use of ASR, encouraging innovation and motivating providers to transition away from services that rely entirely on human captioning. And any uniform rate can be adjusted over time, if and when ASR generates a material reduction in costs.

[289] *See Further Notice* ¶¶ 61-62.

2) A Separate Per-Minute Rate of $0.49 for ASR-Based IP CTS Lacks Any Basis in the Record.

According to the Fund Administrator, the recommended rate for ASR-only IP CTS represents "slightly more than the fixed cost portion" of the interim rate that it proposed for CA-assisted IP CTS.[290] To make this calculation, the Fund Administrator took the following three steps:[291] First, the Administrator estimated the projected allowable cost of providing CA-assisted IP CTS in 2018-2019 ($1.3223); next, it estimated the portion of that projected cost attributable to purportedly fixed costs ($0.3659); and finally, it took the ratio of "projected fixed costs" to "projected total costs," multiplied that ratio by its proposed interim rate for CA-assisted service, and rounded up.[292]

Even if it were appropriate to set a separate rate for ASR-exclusive services (and it is not),[293] the Fund Administrator's approach would be arbitrary and capricious, and fatally flawed. As an initial matter, the Fund Administrator did not have *any* data on the cost of providing ASR-exclusive service, the projected demand for ASR-exclusive service, or the cost of scaling an ASR-exclusive service while maintaining service quality.[294] No company provides an ASR-exclusive IP CTS service today. And, in fact, the only two companies that have applied for certification to offer an ASR-exclusive service have not supplied this type of cost information.[295] In an effort to

290 *Fund Administrator's Report* at 24.

291 *Fund Administrator's Report* at 24 & n.40.

292 This calculation can be represented mathematically as follows: $0.49=$1.75*($0.3659/1.3223).

293 *See supra* Part VI.E.1.b.i.

294 *See Fund Administrator's Report* at 24.

295 *See id.* (noting that two entities have sought authorization to provide ASR-exclusive service and observing that "[n]either applicant has offered ASR cost of service or ASR demand projections").

address this conspicuous gap in the record, the Fund Administrator turned to other providers' allowable reported cost information for CA-assisted IP CTS, even though rates for IP CTS have not been set based on allowable costs.[296] Moreover, that information does not reflect or project any fixed, variable, or otherwise incremental costs that may be uniquely attributable to offering ASR, including any specific costs related to implementing, scaling, operating, maintaining and administering fully automated IP CTS.[297] In short, these data do not provide a dependable basis for calculating a separate rate for ASR-exclusive service.[298] And this evidentiary issue provides a sufficient basis for setting aside the Fund Administrator's recommended rate.[299]

Additionally, the Fund Administrator failed to consider the asymmetric risks involved in under- or over-compensating ASR providers in recommending a rate of $0.49. As discussed above, there is no basis for reliably estimating the costs of implementing ASR at scale and with sufficient quality controls. If, in light of this uncertainty, the Commission errs in the direction of setting an ASR-exclusive rate too low, doing so could slow the development of ASR and delay its introduction. By contrast, if the Commission errs in the direction of setting a rate that temporarily overcompensates ASR-exclusive providers, that approach poses very little risk. Any windfall

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296 *See id.* at 24.

297 *See Further Notice* ¶ 66 (finding that a wide range of information would help the Fund Administrator to establish whether payments to ASR providers were justified and to determine the costs of providing ASR-exclusive service); *see also id.* (enumerating several categories of relevant cost information, including "a detailed breakdown of the specific variable costs incurred" for ASR calls and documentation concerning "incremental costs associated with engineering and technical implementation, marketing, administrative" support, and management support ("like oversight, evaluation, and recordkeeping").

298 It is also notable that the Fund Administrator made no attempt to account for this evidentiary concern. It did not undertake any effort to estimate these costs, nor did it adjust its recommended rate to reflect estimated fixed, variable, or incremental costs associated with delivering ASR.

299 The Fund Administrator's reliance on the cost of providing CA-assisted service also requires that its recommendation be rejected because that information is inaccurate. For example, the Fund Administrator lacked information on costs that should be allowable, such as those incurred to license intellectual property. *See infra* VI.E.2.

would be small because ASR will account—at least initially—for only a small fraction of the total minutes. And, to the extent that ASR grows quickly, the Commission can reevaluate its approach.

The Fund Administrator's recommended rate should also be set aside because it reflects an important methodological error.[300] Although the Fund Administrator purportedly calculated its recommended rate based on fixed costs,[301] it excluded relevant costs from the calculation. More specifically, the Fund Administrator excluded, without basis, all costs reported as "Other." It appears that the Fund Administrator excluded these costs because it concluded that all costs reported as "Other" were related to the CA function and therefore variable.[302] This conclusion is not accurate. Costs categorized as "Other" appear to include any third-party costs "associated with a contract" to provide IP CTS,[303] such as licensing arrangements that may be necessary to operate a fully automated service,[304] licensing arrangements to provide facilities or equipment,[305] or other subcontractor costs that would not be obviated by the elimination of CAs. For this additional reason, the Fund Administrator's recommendation is not sound and should be rejected.

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[300] *Fund Administrator's Report* at 23 (noting that "variable costs are related to the CA function" while "fixed costs include all other costs").

[301] *Fund Administrator's Report* at 24.

[302] *Fund Administrator's Report 23*; *id.* at Ex. 1-3; *see also Further Notice* ¶ 74.

[303] *Fund Administrator's Report,* App'x A, at 11 (instructions).

[304] *See Further Notice* ¶ 74.

[305] Comments of Ultratec, Inc. and CapTel, Inc. on Petition Filed by Sorenson Communications, Inc. and CaptionCall, LLC Regarding Licensing of Internet Protocol Captioned Telephone Service, CG Docket Nos. 03-123, 13-24, at 7 (Dec. 29, 2014).

2. To the Extent the Commission Must Assess Providers' Costs at All, It Should Treat CaptionCall's IP License Costs the Same as It Treats Other Providers' IP License Costs.

In the *Further Notice*, the Commission acknowledges that any "reasonable" license fee paid by an IP CTS provider to a third party for technologies used to provide the service is an allowable cost.[306] Although the Commission has expressed concerns about treating license fees to cover IP that was developed by an IP CTS provider itself, the Commission made clear that it was not "prejudging" the issue[307] and sought comment on whether such costs should be allowable.

1. Treating such costs differently from IP licensing fees for other IP CTS providers would not only be arbitrary and capricious but also would create a disincentive to invest in the development of new IP.[308] As Professor Connolly explains, "the treatment of intellectual property must be uniform across providers" because "[a]ny differentiation of treatment distorts outcomes relative to an unregulated market."[309] There is no legitimate basis for treating CaptionCall's IP licensing costs differently from those of other providers.[310] Other IP CTS providers acquire rights to use intellectual property by entering into ongoing license agreements and paying ongoing licensing fees.[311] These licensing fees have been considered an "allowable cost," and it is difficult

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306 *Further Notice* ¶ 75.

307 *Further Notice* ¶ 35 n.127.

308 *See Further Notice* ¶ 76.

309 Connolly Decl. ¶ 54.

310 *See* CaptionCall, LLC Comments on Rolka Loube Payment Formulas and Funding Requirements, CG 13-24, 10-51, 13-123 (May 29, 2018); *Further Notice* ¶¶ 33-35; *see also 9-7-17 CaptionCall Ex Parte* (explaining that if the Commission moves to a cost-based methodology it must ensure that costs are well defined and noting that neither the Commission nor the Administrator has at its disposal a fulsome, apples-to-apples comparison of the costs amongst IP CTS providers); *see* Connolly Decl. ¶¶ 64-70 (explaining the problems with treating in-house IP differently than external IP).

311 *Further Notice* ¶ 36. As noted above, the Commission was aware that most providers would provide service in this manner when it authorized IP CTS as a compensable TRS. *See 2007 TRS Order* ¶ 10 (noting that "Ultratec's

to see how such costs reasonably could be excluded from a base of reasonable and prudently incurred costs of service.[312] It is therefore also entirely proper for CaptionCall, like its competitors, to structure its IP investment this way. As CaptionCall has consistently explained, these costs should be treated uniformly to ensure that rates are set based on congruous and consistent costs data from providers.[313] Indeed, as Professor Connolly notes, the "absurdly large" range of provider costs that results if one excludes CaptionCall's IP costs *itself* indicates that that exclusion "leads to dramatically biased and incorrect provider cost evaluations," which "should make one question the validity of the assumptions behind the" exclusion.[314]

CaptionCall's investment in IP development also advances the Commission's goals for TRS. Most prominently, the Commission seeks to "increase [providers'] efficiency through innovation and cost-reduction."[315] This objective comports with the statutory mandate to make TRS available in the most efficient manner and not to "discourage or impair the development of improved technology."[316] Ultratec, the primary third-party provider of IP CTS technology, already licenses its intellectual property to Sprint and Hamilton. Even if Ultratec were willing to license intellectual property to CaptionCall as well (which it has not), this arrangement would

captioned telephone service was provided only via proprietary equipment and technology, and that Ultratec was the only company offering consumers any type of captioned telephone service"); *id.* ¶ 19 (conditioning approval of IP CTS "on Ultratec's representation that it will continue to license its captioned telephone technologies, including technologies relating to IP CTS, at reasonable rates").

[312] *Further Notice* ¶ 36.

[313] *CaptionCall 5-29-18 Ex Parte*; *see also* Connolly Decl. ¶ 54 ("[T]he cost of using intellectual property is and must be treated equally regardless of whether the intellectual property is owned internally or is licensed from an outside firm. Any differentiation of treatment distorts outcomes relative to an unregulated market.").

[314] Connolly Decl. ¶ 52.

[315] *Further Notice* ¶ 70; *see also id.* ¶¶ 69, 94 (seeking to "encourage higher-cost providers to become more efficient").

[316] 47 U.S.C. § 225(d)(2).

result in the three largest certified providers paying IP licensing fees to a single entity. The consequence would be less competition and less service differentiation—outcomes that are detrimental to innovation and efficiency. It would frustrate the Commission's pro-competition and pro-efficiency purposes to refuse to compensate CaptionCall for investments that further the Commission's stated goals.

Moreover, the Commission's proposed carve-out for internally developed IP would have the perverse consequence of discouraging providers from developing intellectual property, for fear that they will never recoup its value.[317] Yet, as Professor Connolly explains, "there is significant evidence that most innovations are carried out by established producers who systematically undertake in house R&D," so it makes little sense to establish a compensation mechanism that systematically "favor[s] external R&D over in-house R&D."[318] Indeed, doing so "can only lead to a less optimal allocation of R&D resources and lower rates of innovation," and "would artificially bias firm decisions against [keeping R&D in-house through] vertical integration."[319]

In addition to the policy reasons to treat IP costs similarly, CaptionCall clarifies the background for separating its IP costs. CaptionCall developed some but not all of the intellectual property used to support its IP CTS operations years prior to CaptionCall's offering the service and seeking compensation from the TRS Fund. It has continued to develop new technology and incorporate that technology into its captioning service since that time. In 2017, CaptionCall and

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[317] Connolly Decl. ¶¶ 55-56. Even if such investment could be recovered as an allowable submitted R&D cost under the Commission's proposed rate-setting methodology, that would be true only for current providers' *future* costs, not any costs CaptionCall previously incurred to develop its IP. Moreover, prospective providers could be deterred from investing in new technology and entering the market, because their R&D costs incurred prior to entering the market would not be recoverable as submitted costs or via subsequent affiliate licensing.

[318] Connolly Decl. ¶ 55.

[319] Connolly Decl. ¶ 56.

its affiliate Sorenson Communications both transferred their IP assets to a separate but affiliated entity, Sorenson IP Holdings, LLC. The Company engaged Deloitte Tax LLP ("Deloitte") to conduct an independent assessment of a reasonable royalty for the IP license. Subsequently, Sorenson IP Holdings entered into a license agreement with CaptionCall's parent company which, in turn, entered into a license agreement with CaptionCall.

There is widespread recognition of the benefits of centralizing IP assets in a separate holding company, which include benefits related to security, monetization, efficiency, and tax.[320] In fact, when CaptionCall decided to transfer its IP assets, the Commission was using the MARS Plan—not a rate-of-return or submitted-costs approach—to set rates at that time, any potential changes in CaptionCall's costs would have had no impact on IP CTS rates. CaptionCall's transfer of its IP assets was designed, among other things, to allow it to share IP among its operational units.[321] The IP needed to support CaptionCall's IP CTS and VRS businesses are distinct but overlapping. For instance, the proprietary intellectual property used to schedule CAs in order to provide optimal staffing and to route calls are used both in CaptionCall's IP CTS business and in its VRS business. Structuring shared ownership of this common asset without creating a separate holding company would have entailed significant complications, including the potential need for one operational entity to license IP to another. It was a business decision made irrespective of the

[320] *See, e.g.*, Rand Brenner, Licensing Consulting Group, *3 Big Benefits of Using an IP Holding Company* (Dec. 20, 2016), http://licensingconsultinggroup.com/3-big-benefits-of-using-an-ip-holding-company/; Pamela S. Chestek, *Control of Trademarks by the Intellectual Property Holding Company*, 41 IDEA 1 (2001); *see also* Connolly Decl. ¶ 57 ("The concept of transfer pricing within vertically integrated firms is standard and has a rather long history of regulatory supervision to ensure appropriate tax treatments.").

[321] The Commission may have misunderstood CaptionCall's statement that this action was aimed "to safeguard its VRS and IP CTS intellectual property." *Further Notice* ¶ 35. This statement was intended to underscore the importance of formalizing the relationship among multiple Sorenson entities and protect these entities' legal interests in their intellectual property, not to suggest that concerns about network "security" were the primary driver of this decision.

rate-setting methodology that the Commission *might adopt at some future date*, to avoid these complexities and inefficiencies.

Moreover, the Commission is also misguided when it expresses concern about the "difficulties of objective valuation" of internal IP licensing.[322] CaptionCall has developed a licensee fee valuation based on the independent analysis of a third-party consultant, Deloitte, utilizing the best available methodology under the U.S. Treasury transfer-pricing regulations. And even if the Commission disagrees with the specific valuation that CaptionCall previously has submitted to Rolka Loube for non-rate-setting purposes, that is not a basis for finding that CaptionCall is not entitled to *any* compensation for its IP costs. At the very least, the Commission should expressly recognize that internal IP licensing costs are an allowable cost category, when reasonable and consistent with the Commission's affiliate transaction rule.[323] It would be arbitrary and capricious, as well as premature, for the Commission to categorically determine that such costs

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[322] *See Further Notice* ¶ 76. In addressing a similar issue in the VRS context, the Commission expressed concern about allowing compensation for the imputed value of intellectual property, because the value "would necessarily be speculative and inexact." *See 2017 VRS Order*, 32 FCC Rcd at 5902 ¶ 21 n.66 (describing that "any attempt to value intellectual property would necessarily be speculative and highly inexact, especially in the absence of evidence based on arm's length marketplace transactions involving such property").

[323] The Commission's affiliate transaction rule would limit the licensing costs that CaptionCall could submit during a rate-setting proceeding to the lower of the "fair market value and net book cost" of the licensed IP. *See Further Notice* ¶ 76 & n.242; *see also* 47 C.F.R. § 32.27(b)(2), (c)(2), (d). Deloitte's valuation is based on the best available methodologies, [[**BEGIN CONFIDENTIAL INFORMATION:** [redacted] **:END CONFIDENTIAL INFORMATION]]** Deloitte's analysis thus demonstrates, at minimum, the feasibility of establishing a fair market valuation. *See* Connolly Decl. ¶ 58 ("U.S. Transfer Pricing Regulations allow different methods to best determine the appropriate arm's length price. Based on the accepted methods, Deloitte determined . . . the most appropriate method for determining the arm's length price for [CaptionCall's] intellectual property."). And the net book costs would be based on CaptionCall's engineering expenses in developing the IP. *See 2017 VRS Order*, 32 FCC Rcd at 5902 ¶ 21 n.69. To the extent the Commission construes the affiliate transaction rule to require the use of arm's length marketplace transactions involving similar property, that is not information that would be available to any individual provider, but it is available to the Administrator.

are *never* allowable because of perceived shortcomings in CaptionCall's *current* valuation (which, as noted, was not developed with this proceeding in mind).[324]

CONCLUSION

CaptionCall supports the Commission's goal of ensuring that IP CTS remains available to eligible users. Consistent with the record and the ADA, the Commission should adopt only targeted reforms to its rules regarding user eligibility and provider practices in the IP CTS program. And it may not prioritize generating TRS Fund cost savings over Section 225's primary objective of ensuring that IP CTS is "available" to individuals who need it. With respect to a new IP CTS rate methodology, the Commission should attempt to replicate market-based incentives and adopt a uniform price cap for IP CTS with a rate of $1.75 per minute, for a three-to-five year period. At the conclusion of the rate period, the Commission should reevaluate the X-Factor or conduct a reverse auction based on the framework proposed herein. To the extent the Commission considers providers' submitted allowable costs in setting the initial rate (or at any point thereafter), it should treat providers' costs, including IP-licensing costs, uniformly.

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[324] In the *Further Notice*, the Commission declined to set interim rates that reflect this imputed value, noted the fact that CaptionCall has not "explain[ed] what has become of the price paid by CaptionCall's affiliate to purchase the intellectual property from CaptionCall," or why "any licensing fee could not simply be paid out of the invested purchase price—making the transaction a 'wash' between the two affiliates." *Further Notice* ¶ 35 n.126. The Commission's statement reflects a misunderstanding of the purpose of transfer pricing studies, which are routine and recognized methodology of determining the value of goods and services for entities under common control and allocation of taxes for international transactions. When companies are under common control, there is typically not a "purchase price" because any transaction would not be arms-length and, even if there was, the value of transaction would be eliminated in consolidation of financial statements. The only recognized and acceptable way to determine the value of the assets is to have a third-party complete a transfer pricing study. Indeed, the IRS has guidance on how to conduct such transfer pricing studies when common control is with a foreign parent to ensure proper allocation of taxes. *See* Internal Revenue Service, Common Ownership or Control Under IRC 482 - Inbound, https://www.irs.gov/pub/default_path_no_value/isi_c_06_02.pdf (last visited Sept. 17, 2018). CaptionCall retained a leading national firm, Deloitte, to conduct the IP transfer study. The purpose of the transfer was to enable the Company to develop intellectual property for new business lines by drawing on the patents created by all subsidiary companies.

By adopting the reforms and measures discussed herein, the Commission can achieve its goals of improving the efficiency of the program while ensuring the sustainability and availability of IP CTS for individuals who need it.

Respectfully submitted,

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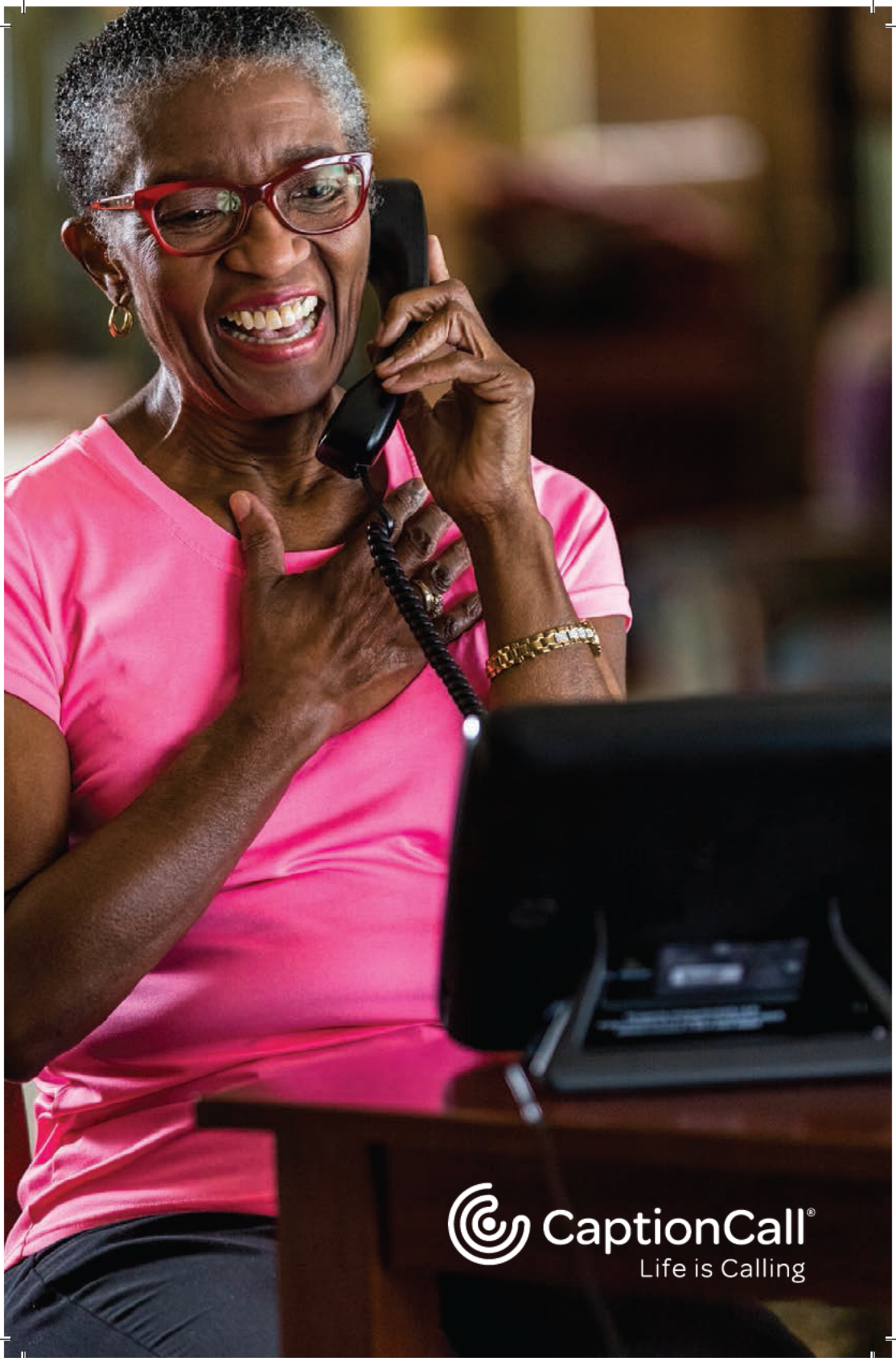
September 17, 2018

APPENDIX A



Hi. I am a bilateral cochlear implant user. Your CaptionCall phone is the best thing I have ever found to make and receive phone calls over the last few years. I just recently found out that you have a CaptionCall Mobile app for the iPad. IT'S WONDERFUL! Installed it and it works GREAT. Now, I can receive phone calls when I'm out and traveling.

Best regards.

Bob, Englewood, FL

I am so happy to be able to communicate with my family ... they are so used to not calling—I had to remind them and show them the unit when they came for Thanksgiving ... AMAZING ... Totally grateful for opening up conversations. Tears of JOY ... thank you so much.

Mary, Decatur, IL

This phone is a great piece of equipment, both in looks and performance. My hearing is so bad that I almost gave up answering calls in the past, but with my new CaptionCall phone, the sound quality along with captions are fantastic!

Dehalas, Shingletown, CA

I love it. I'm 93 with only 6% hearing in one ear and 30% in the other. I have had a very hard time talking to anyone with an accent, especially when they talk too fast. This is a very helpful communication tool, and I'm so thankful to have the use of it. I quite likely lost most of my hearing as a result of mortar and artillery shells landing near me in WWII.

Joe, Des Moines, WA

I have lost all of my high frequency hearing, which makes it totally impossible to understand what people are saying when using a regular telephone or cell phone. The CaptionCall phone is my lifeline to telephonic communication. I've had my phone for over 10 years, and I would be completely lost without it!

Respectfully,

Don, Melbourne, FL

I have had my hearing phone for over two years. The phone allows me to read what my caller is saying to me. I hear some words, but others I do not hear. Having the hearing phone makes my life much easier. I wish I had got the phone 14 years ago. I recommend the hearing phone to my friends who have problems like I do. Please keep up the good job you are doing.

Sincerely,

Rose-Marie, Henderson, NV

It is a relief to be able to do your own personal and business calls rather than having someone else do it for you.

Diana, Attleboro, MA

I was not able to use the telephone for several years. Calls went unanswered because of my hearing or the lack thereof. New expensive hearing aids did not help. I had given up using the phone completely. When CaptionCall informed me that I could get a CaptionCall phone, I was somewhat skeptical. This phone made all the difference. I now answer the telephone without a problem and again feel connected to the world.

Hank, Romulus, MI

Life after 80, I began having a CaptionCall connection. It's the only phone I can hear well enough to carry on a conversation. Not sure how I lived before I had my CaptionCall, too old to remember.

Gina, Bellevue, WA

Hi, I don't normally take the time to thank a company for doing a good job, but CaptionCall deserves a special thanks. My parents have been having problems with their phone and your company sent them a new headset and phone cable. You guys are a great help for the elderly. I hope I never have the problems my parents have with their hearing, but if I do, I know who to contact. It's nice to know someone is looking out for our senior citizens.

Thanks again and GOD BLESS,

Chuck, Port Charlotte, FL

The CaptionCall phone has made using the telephone possible, but there's more. For me, the biggest advantage is that it works with both my hearing aid types. What I've found here is a miracle for me. I can live more of a normal life. Without the hearing aids, I hear nothing. The text on the CaptionCall phone is still important because understanding some people is difficult.

John, Reading, PA

I can actually hear and understand what is being communicated.

Upon receiving my caption phone, it was one of the best, pleasant, professional presentations that I have ever experienced. I have recommended the caption phone to many.

All I can say is that it is the best thing that has happened to me and my wife.

Jerry, Hillsboro, OR

I have had my CaptionCall phone for several months now and my hearing loss for 75 years. I am so glad to be able to have this phone where I can read what is being said, as many people don't speak clearly. CaptionCall has solved my problem and this has made my life so much easier with my doctor appointments. CaptionCall is a great phone. I hope more people learn about it.

L.J., Bulverde, TX

OMG, this is the most wonderful phone ever. I would actually freeze up and not want to answer my regular phone—I could hear the callers, but couldn't understand what all they said. This has been with me for most of my life, not hearing well. Did not even want hearing aids, but got one that I really like after going through about 8 of them. Totally deaf in one ear and really appreciate my CaptionCall phone. I have been telling everyone about it—the ones that don't hear well, it is a GOD send to see what you are missing in your phone calls. Thank you again, it has put me back to now wanting to use the phone that I avoided like the plague before. Thank all of you.

Millie, Brooksville, FL

I am a 96-year-old WWII veteran. I lost almost all of my hearing 76 years ago in a combat related incident with a German Tiger tank. My wife has answered the phone for all of that time since. Along with 60% word recognition loss, hearing is a job, but I would not care for the alternative. About two years ago when I received my CaptionCall phone, I have been back in society full time. In fact, I am a bit jealous when my wife beats me to the phone. I have only one word for this phone: FREEDOM.

Stan, Bend, OR

Without my CaptionCall telephone, I would not be able to hear my children, my grands or my political candidates begging. Now I jest, but how frustrating would it be to not be able to call a computer repairman? Make an appointment with a person you need to see ... like your family doctor or your favorite pedicurist. Those of you who have good hearing know how frustrating it is when your phone is out of order, I am sure. Well, we who are 80 and 85 percent deaf would be like a fish out of water without our CaptionCall phone. The young man who services my area is so good to me when I have a problem and so very patient. Thank God for CaptionCall. Just my two cents.

Bobbie, Albertville, AL

My CaptionCall phone was a life saver after getting my cochlear implants. A regular phone was useless for me, even those with volume control, and TTY phones were such a hassle to use. At least with the captioning on the CaptionCall phone, I was able to understand most conversations. There are always people whose voices are inaudible or they mumble, which makes captioning hard to get.

I also take my iPad with me on trips, so as long as I have Wi-Fi where I go, I can use the CaptionCall Mobile for iPad to make/receive phone calls or to get messages.

Sincerely,

Ann, New London, MO

As an attorney, it is very important that I get the facts straight many times a day. Since I have a hearing loss, it is even more important that I use my caption phone in order to communicate with clients and other attorneys. I would not be able to continue to work without it.

Leonard, Chicago, IL

My CaptionCall phone has been a lifesaver for me. I have profound hearing loss and have special problems understanding some of my grandchildren because of the tone of their voices. But with the CaptionCall phone, I am able to understand so much. I was particularly excited about getting CaptionCall on my iPad. I take several long trips each year and can now keep in touch while away. Thank you, thank you, and thank you.

JP, Alexandria, VA

I have had CaptionCall for six years and it moved with me across town to a retirement village. I cannot do without it, and I have just this minute shared the October Newsletter with our resident nurse who is new here, so that she can make everyone in our village aware of this wonderful service.

Hubie, Tuscaloosa, AL

I have had my CaptionCall phone for two years now, since 2015.

You see, I have had hearing loss since my early 20s, and it is hard to hear the phone sometimes.

I just love my call captioning phone, as I can see who is calling and what they are saying on the screen. I would recommend this phone to anyone who has hearing loss. It's the best phone ever.

Sincerely,

Tammy, Fort Pierce, FL

CaptionCall is such a blessing. My husband is very hard of hearing, but also has dementia. Being able to see as well as hear when his relatives call from other parts of the United States helps him to understand what they are saying so much better.

A big thank you to the lady that hooked up our phone. She was so helpful so we understood how the phone worked. It's wonderful as we have to use it often when my husband falls for 911. It gives us confidence that someone to help is just a call away. Thank You.

Annette, Springfield, MO

I so appreciate my new phone. It has given me a better quality of life—still can't believe it was free. Your service person was exceptional and the phone is so easy to use. Since I have a vision problem as well, the phone has helped with that also. And all of this because my hearing aid pro had the information in their office. Thank you.

Eleanor, Eldridge, Iowa

First of all, I love my caption phone. It makes me feel great knowing that I can read and not miss out on what people have to say to me. I was always passing the phone to my husband because I was afraid I would get the wrong message and cause problems. Also, I would like to say the man who set up my phone for me was a great guy. He talked to me and helped me understand everything he did. He was real friendly. Well thank God for CaptionCall phones. I've never been more thankful!

Lorraine, Fall River, MA

I could not use a telephone at all for 46 years and after receiving my cochlear implant still needed help until I received a CaptionCall telephone several years ago. Now, I do all my own telephone calls. Needless to say, CaptionCall has changed my life quite a bit!

Carol, North Port, FL

This phone is such an important asset to my life. You simply cannot understand so many people that you talk to. People don't realize how much they mumble when talking on the phone and this CaptionCall phone just clarifies it for you. I am so grateful for my caption phone and have told many of my friends that they need to get one.

Betty, Holladay, UT

Just wanted to say thank you so much CaptionCall for allowing me to communicate with my family over the phone again! I'm only 41 but have had Meniere's disease and hearing loss from that disorder and a car accident since I was 19. In the past 10 years, my hearing has gotten to the point that I was unable to use the phone for conversations and settled for texting, emailing or messaging my family and friends.

When I got CaptionCall installed earlier this year, the first phone call I made was to my mom who lives in California. She didn't realize who she was speaking to for a moment, since it had been so long since she heard my voice on the phone, LOL. My mom was like, "How is it possible you are talking on the phone?!" The gentleman that installed our phone was very nice and knowledgeable! He did a fantastic job and went above and beyond answering our questions and helping me feel comfortable using the phone again!

Sincerely,

Erin, Pekin, IL

I live by myself and could not survive without my CaptionCall phone. Doctor's offices, pharmacies and special calls with numbers could not be complete without my wonderful phone.

Sandi, Mesa, AZ

I cannot express how very much I am enjoying my new phone. It enables me to check back on a questionable word and I am able to adjust sound. The phone has broadened my general day-to-day, being able to communicate with anyone now. THANK YOU ... You have brightened up my whole life. I am 83 now and looking forward to 84!

Sincerely,

Beverly, Newburyport, MA

I am very happy with my CaptionCall phone. I have been wearing hearing aids for about 8 years. Until I got CaptionCall, I had to go to my daughter's home when I needed to take care of business over the phone and get her to make the call for me because I could not understand much that was said over the phone.

Not anymore! I no longer have to bother my daughter; that makes me feel more like my old "independent" self. Thank you, CaptionCall, for helping me get that back.

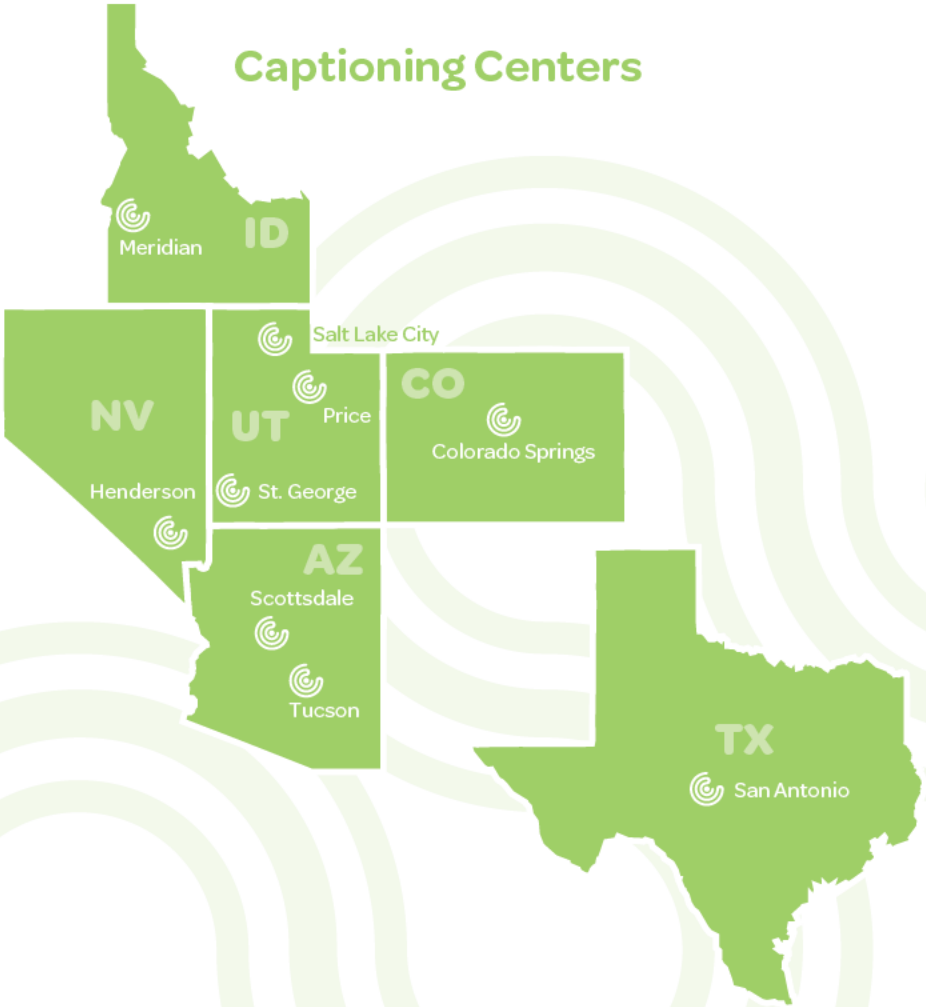
Jack, Houston, TX

CaptionCall®
Life is Calling

Our Mission

Helping people with hearing loss stay socially connected for a longer, happier, healthier life!

Captioning Centers



APPENDIX B

Text Captioning and Speech Understanding: A Literature Review

Brennan R Payne, PhD

Department of Psychology, Neuroscience Program, and Center on Aging, University of Utah

I. Introduction

Competence in the workplace, managing personal and health affairs, civic engagement, and social and cognitive enrichment all hinge on the ability to successfully understand language— that is, to derive *meaning* from the arbitrary sensory input that we experience as speech or text. The brain is capable of rapidly analyzing and categorizing complex and often ambiguous sensory inputs as spoken and written words, and, remarkably, seems to immediately and effortlessly link these inputs with a rich array of knowledge that is experienced as the understanding or comprehension of those perceptual events. At the same time, age-related changes in sensory and cognitive functioning can have a profoundly negative effect on these stages of speech comprehension.

One of the most striking examples of this is in the negative effects of age-related sensorineural hearing loss (*presbycusis*). Moreover, even when adults can successfully perceive speech in challenging listening environments, the additional cognitive effort required to extract meaning from degraded sensory input has downstream consequences on subsequent speech comprehension and memory. The increased *listening effort* induced by the demands of perceptual decoding is an oft-cited *hidden effect* of hearing loss and is crucially important in understanding the challenges listeners face in high-level speech understanding. At the same time, very little work has examined whether these cognitive burdens can be ameliorated through the multi-modal presentation of language. The visual presentation of captioned speech offers a promising route that may reduce the cognitive workload of auditory perceptual decoding in the face of age-related hearing loss and environmental noise. In what follows in this this brief literature review, I provide some of the initial conceptual foundation to motivate the value of text captioning for speech understanding in hearing loss, drawing primarily on the empirical literatures in cognitive audiology, psycholinguistics, and cognitive neuroscience. The following specific topics are discussed, in turn (*a*) the measurement of speech understanding, (*b*) characterizing the challenges that listeners face in speech understanding, (*c*) the prevalence and demographics of challenges posed by hearing loss for speech comprehension across the population, and (*d*) the potential value of text captioning for ameliorating the effects of hearing loss on speech understanding.

II. Measuring Speech Understanding

Difficulties surrounding speech understanding in noisy environments is one of the most widely-cited complaints of people with hearing impairments (Kramer, Kapteyn & Festen, 1998; Plomp, 1994). Although individual self-reports of comprehension difficulties are important clinical indicators for hearing impairment, researchers require empirical measures and laboratory-based paradigms to study speech comprehension performance in order to build a scientific basis of the difficulties posed by hearing loss for speech understanding—such a goal is critical for both basic speech science and for clinical purposes. It is not surprising then that a multitude of methods for measuring speech understanding have been advanced from multiple disciplines, ranging from audiological assessments in clinical settings to experimental paradigms in psycholinguistics and neurolinguistics to study real-time comprehension processes. Several of the most prominent measurement approaches and experimental paradigms for quantifying speech understanding are discussed below.

Speech Perception. The most common clinical assessments for studying speech perception are through tests measuring *speech reception thresholds* (SRTs). SRT tests measure the softest intensity at which an individual can repeat speech input at least 50% of the time. The listener's task is to "shadow" the speech, repeating aloud each word as it was heard, thus minimizing cognitive and memorial demands. Speech input varies across assessments, with early studies measuring SRTs to bisyllabic stressed words (spondees) (Levitt & Resnick, 1978), to other studies that measure SRTs to real-world speech, such as sentences and discourse (e.g., Nilsson et

al., 1994). These measures have high clinical utility and often overlap with assessments from pure-tone audiometry, providing a secondary and arguably more real-world assessment of hearing acuity. Importantly however, a substantial number of studies have shown that even when speech is presented in signal-to-noise ratios (SNR) well above an individual's speech reception threshold (i.e., with speech shadowing performance near ceiling, ~99-100% accuracy), subsequent comprehension and memory are still impaired, reflecting the downstream consequences of effortful listening on speech understanding (Cousins et al. 2014; Piquado, Cousins, et al. 2010; Pichora-Fuller, 2003; McCoy et al., 2005; Rabbitt, 1968; Rabbitt et al., 1991; Wingfield et al., 2004). Thus, it is critical for studies aiming to assess speech understanding to measure beyond SRTs.

Speech Memory. Speech memory tests have been adopted in both clinical settings, and in basic laboratory research (e.g., QuickSIN test, Killon et al., 2004). These tests typically involve presenting speech input (typically at varying SNRs), and having participants recollect or perform a recognition memory task at some delay. The delay may range from only one second after perceiving the speech, to upwards of minutes or hours, in order to assess long-term memory. In immediate free recall variants, participants listen to each speech stimulus trial (e.g., a spoken sentence) and as soon as it is finished, try to recall the sentence as accurately as possible. Participants give their responses aloud into a microphone; their production is then transcribed and scored for recall. Recall can be scored as number of keywords, verbatim recall accuracy, and the proportion of propositions recalled correctly, using gist criterion for scoring (Kintsch & van Dijk, 1978; Brown et al., 2008). Such measures have been shown to be very sensitive to sensory declines as well as age-related declines in cognitive abilities (e.g., Wingfield et al., 1999; Stine & Wingfield, 1990; Peele et al., 2006).

Another widely used speech memory assessment is the speech recognition memory test. In these tests, participants are presented with test items that were either previously observed or not previously observed at a delay. This approach allows for the application of signal-detection theory to study recognition memory (e.g., Neath & Surprenant, 2003). Signal detection theory involves measuring the hit rate and the false alarm rate in recognition memory to estimate two indices y. The first, discriminability (d′), and the second measure C, is a measure of response bias. Larger d′ values indicate a better ability to truly discriminate between old and new items. Values of C above 0 indicate a conservative bias (less willing to guess old) whereas values of C below 0 indicate a liberal bias (more willing to guess old). Such discriminability measures are critical in studying memory aging, as older adults have been shown in several studies to show responses biases in recognition memory (Ratcliff et al., 2006; Huh et al., 2006).

Speech Comprehension Assessments. Speech comprehension tests typically require listeners to follow a passage of discourse (e.g., a lecture or story) and then to answer a series of questions probing the content of the speech (e.g., Gordon, Daneman, & Schneider, 2009; Murphy, Daneman, & Schneider, 2006; Schneider, Daneman, Murphy, & See, 2000; Sommers et al., 2011; Tye-Murray et al., 2008). For longer passages, this testing format may introduce a significant memory requirement. One way to minimize the influence of memory demands is to use short-duration speech segments (single sentences or passages up to 1 min; e.g., Kei et al., 2003). Another approach is to query the listener during the stimulus (e.g., at regular intervals during the presentation of a short narrative discourse), instead of at the end of the presentation (e.g., Best et al., 2016). One important consideration here is the type of probe question used. Different probe questions can be designed to probe comprehension at levels ranging from surface-level or structural aspects of the speech, such as probing thematic role assignment in object-relative clauses, to fact-based propositional semantics (e.g., "Which room was the potted plant in?"), to more abstract and high-level situational representations (Kintsch et al., Zwaan & Radvansky, 1998), such as probing intended inferences. Other approaches involve probing listeners' judgements of the perceived plausibility or grammaticality of speech, which is useful in conjunction with experiments that present speech stimuli that are either occasionally semantically or syntactically incongruent (e.g., Payne et al., 2016). Special care must be taken in determining probe questions, as the type of question can itself modulate individual comprehension strategies (cf. Swets et al., 2008).

"On-line" Comprehension. The methods covered thus far measure comprehension processes at some delay relative to the speech input. Though, sometimes these delays are quite brief, it is important to note that language processing in the brain occurs rapidly (on the order of milliseconds) and is processed in a highly incremental fashion, as input continually unfolds (Rayner & Clifton, 2009, Payne et al., 2015). Therefore, to be able to effectively understand the mechanisms giving rise to language perception and comprehension processes in real-time, experimental psycholinguists and cognitive neuroscientists have focused on developing methods and paradigms to study these real-time moment-to-moment processes, what have come to be called "*on-line*" measures of comprehension. Such measures are argued to index immediate changes in processing underlying the incremental interpretation of language. For example, the

self-paced listening paradigm (Ferreira et al., 1996), is a real-time reaction time based measure of speech comprehension. The SPL paradigm is an auditory equivalent to the commonly used *self-paced reading* paradigm in visual sentence processing. This task involves presenting segments of speech ranging from single words to small multi-word phrases, one phrase at a time, with the presentation rate under the control of the listener. Reaction times are measured from the offset of the speech segment to the onset of the button press to begin the next segment. This latency partially reflects the amount of time taken to finish encoding the information in that speech segment. By comparing sentence stimuli that vary in linguistic features (e.g., word frequency, syntactic complexity, lexical ambiguity), or populations that vary in language and speech processing ability, one can examine differences in speech processing on a moment-by-moment (segment-by-segment) basis, revealing real-time difficulty in language processing as it occurs. This method has been widely applied, including in children with specific language impairments (SLI), in aphasia, and in bilingual language processing (see Papadapoulou et al., for a review). Importantly, this method has also been used to study the real-time effects of hearing impairment on speech comprehension (Piquado et al., 2012). Other, more recent behavioral methods have utilized eye-tracking technology to study changes in gaze patterns when listening to speech. For example, the visual world paradigm (VWP) is a family of methods for studying real-time language processing in language comprehension and production that can be used with participants of all ages and most special populations. Participants' eye movements are monitored via infrared eye-tracking cameras. Eye-movements are monitored to objects presented in a visual workspace or pictures on a display while participants listen to spoken language about the contents of the visual world. Eye-movements in the VWP provide a sensitive, time-locked response measure that can be used to investigate a wide range of psycholinguistic questions on topics running the gamut from speech perception to interactive conversation in collaborative task-oriented dialogue. It's use in studying hearing impairment and speech perception is only recently begun to be explored, but early results suggest it is a very promising tool for probing real-time comprehension processes (e.g., Kuchinsky et al., 2014).

Neuroimaging and Physiological Measures. Methods from cognitive neuroscience have also been widely explored to study the cognitive and neural mechanisms involved in real-time speech processing. These include measures of brain electrophysiology (electroencephalography, EEG), functional magnetic resonance imaging (fMRI), optical imaging, and physiological measures such as heart-rate variability and pupillometry. Due to space considerations, not all of these measures can be discussed in full detail. One method in particular that has shown great promise in studying critical components for speech comprehension processes is EEG. Both EEG and magnetoencephalography (MEG; the magnetic counterpart to EEG), studies have reliably shown that auditory cortex entrains to regular temporal information contained in the speech envelope by phase-locking cortical oscillations to both low (~4–8 Hz) and higher (~8-12Hz) frequency information present in the speech envelope. Peelle and Davis (2012) recently presented a model through which such low-frequency oscillations in the acoustic speech signal form the foundation of a rhythmic hierarchy supporting spoken language. Importantly, such neural oscillatory markers appear critical for speech intelligibility in noise. Obleser and colleagues (2012) showed that neural oscillations in the alpha frequency band (8-12 Hz) track the acoustic degradation of speech, such that more difficult speech results in increased alpha oscillations during listening. Critically, this increased alpha activity predicted poorer subsequent speech comprehension. Similarly, in older adults, individual differences in the severity of hearing loss predicts alpha power enhancement in speech (Petersen et al., 2015).

III. Hearing and Challenges to Speech Understanding

Sensorineural hearing loss is, by some estimates, the *third-most prevalent* chronic medical condition in older adults after arthritis and hypertension, afflicting approximately 50% of adults over 65, and over 80% of adults over the age of 70 (Cruickshanks et al., 1998). Age-related hearing is attributable to changes throughout the ascending auditory pathway, beginning at the cochlea and rising up through auditory cortex (Wingfield & Peele, 2012). Most notable in presbycusis is a loss of basilar membrane hair cells, inner-hair cell ribbons, and spiral ganglion cells— changes that characterize the normal pattern of high-frequency hearing loss with aging (~2-8 kHz). These higher frequency bands carry a wide swath of acoustic information that is critical for understanding speech, especially for the perception of consonants (e.g., */f/, /s/,* /tʃ/). Further, degeneration of cochlear nerve axons and auditory brainstem pathways is reflected in the slowing of auditory brainstem responses with advancing age (Konrad-Martin et al., 2012), and results in degraded temporal auditory processing, for example in detecting brief temporal gaps in continuous tones (Schneider et al., 1994).

In addition to changes in the central auditory pathway with aging, everyday listening occurs within environments that present challenges to auditory processing. Typical audiometric tests that are sensitive to

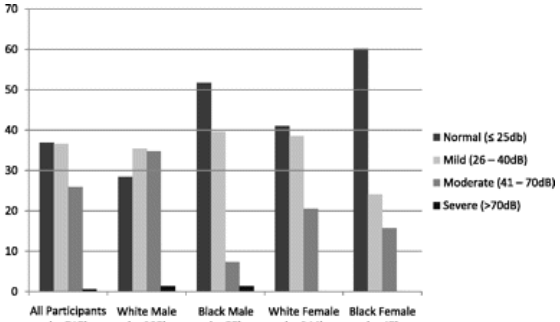
a number of changes in central auditory processing do not explain the full range of difficulties that adults with hearing loss report in speech listening. Many older adults with mild-to-moderate hearing loss report an increased difficulty in understanding speech in the presence of background noise, and everyday listening frequently occurs in the context of acoustic challenges that degrade the auditory signal. In real life speech processing, listening environments contain substantial background noise, competing speech sources (e.g., the cocktail party phenomenon), or variability in speaker attributes (e.g., speech rate, accent). Hearing impairment interacts with these external sources of noise to reduce the fidelity of information reaching auditory cortex.

Sensory processing draws on resources from domain general cognitive and neural systems to support perceptual decoding. Indeed, in the case of speech, the consequences of increased perceptual effort for speech encoding extend beyond just impairments in episodic memory for language (Rabbitt, 1991), but also impact high-level speech comprehension functions (Surprenant, 1999; Pichora-Fuller, 2003; McCoy et al., 2005; Cousins et al., 2014). For example, sentence comprehension interacts with perceptual demands in hearing-impaired adults, particularly when the sentences are more syntactically complex (Wingfield et al., 2006). Peelle et al., (2011) recently reported the results of a study where brain activity was monitored via fMRI while older adults with age-normal hearing listened to sentences that varied in their linguistic demands. Individual differences in the degree of hearing impairment in the sample predicted the degree of language-driven neural recruitment during auditory sentence comprehension across multiple cortical and subcortical regions, as well as subcortical structural integrity. Together, these results suggest that even mild deficits in peripheral auditory acuity (e.g., as a result of normal aging) lead to a systematic downregulation of neural activity during the processing of higher-level aspects of speech, and may also contribute to loss of gray matter volume, particularly in primary auditory cortex.

It may not be surprising from these results then that these effects of impaired hearing go far beyond difficulty in basic speech recognition. Listeners report frustration and fatigue associated with effortful listening over extended periods of time and it has been argued that this increased listening effort and fatigue can result in long-term changes in adults' behavior, with negative consequences for cognitive and neural health. For example, several studies have shown a small but statistically significant correlation between hearing acuity, all-cause dementia (Gates et al., 2011; Lin et al., 2011b), and performance on standardized (non-auditory) neuropsychological tests (Lin et al., 2011a). These effects are maintained even when adjusted for sex, age, education, diabetes, smoking history, and hypertension (Lin et al., 2011a). One explanation for this relationship is that older adults with poor hearing, in an effort to reduce the frustration and cognitive effort associated with listening, will begin to withdraw from social and intellectual activity engagement. Given the growing evidence for a strong relationship between activity engagement, social support, and neural and cognitive health, such *sensory-cognitive interactions* represent an important research challenge in audiology, especially as changes in hearing acuity are compounded by declines in neurocognitive functioning (e.g., working memory, executive control) that occur in normal aging (e.g., Park et al., 1996).

IV. Prevalence of Challenges in the US Population

In this section, I briefly review prevalence statistics regarding speech-relevant hearing loss from large-scale epidemiological studies and historical national health statistics. In 1990 and 1991, the National Center for Health Statistics (NCHS, US Department of Health and Human Services) released the results of a large-scale Health Interview Services survey. They estimated that approximately 20 million persons, or 9% of the total U.S. population, age 3 and older were reported to have hearing problems. In 2014, they released new data suggesting that approximately 37.5 million American adults aged 18 and over (~15% of the population) report some trouble hearing. Data from the National Health and Nutritional Examination Surveys (NHANES), report that nearly 1 in 5 Americans age 12 and older have hearing loss so severe that it limits communicative competence (Lin et al., 2011a). Likewise, figures released by the World Health Organization (2012) show similarly high prevalence rates



	All Participants (n=717)	White Male (n=285)	Black Male (n=57)	White Female (n=244)	Black Female (n=47)
Normal (≤ 25db)	36.9 (31.1 – 42.6)	28.4 (21.7 – 35.2)	51.7 (39.7 – 63.6)	41.0 (33.2 – 48.7)	60.2 (40.9 – 79.4)
Mild (26 – 40dB)	36.6 (31.1 – 42.1)	35.4 (28.0 – 42.8)	39.6 (25.9 – 53.4)	38.5 (32.0 – 45.0)	24.1 (8.6 – 39.6)
Moderate (41–70 dB)	25.9 (22.4 – 29.5)	34.8 (30.0 – 39.5)	7.3 (0 – 15.5)	20.5 (14.9 – 26.2)	15.7 (4.7 – 26.8)
Severe (>70dB)	0.60 (0.02 -1.2)	1.4 (0 – 2.9)	1.4 (0 – 4.2)	--	--

Figure 1. Sex and Race Differences in Hearing Loss among Adults 70+ in the NHANES Survey

internationally, with nearly 360 million persons in the world with hearing loss so disabling that it would influence communication and speech reception (nearly 6% of the world's population).

Importantly, there are a number of demographic, genetic, and cognitive factors that predict individual differences in hearing impairment and speech comprehension deficits in the population. Primarily, normal aging is associated with a substantial increase in hearing impairment in the population, with estimates varying across study samples. Table 1 presents results from the 1990-1991 prevalence of hearing impairment from the NCHS, for example.

Age Group	Population	Number of hearing impaired	Percent of population
Total	235,688,000	20,295,000	8.6%
3-17 years	53,327,000	968,000	1.8%
18-34 years	67,414,000	2,309,000	3.4%
35-44 years	38,019,000	2,380,000	6.3%
45-54 years	25,668,000	2,634,000	10.3%
55-64 years	21,217,000	3,275,000	15.4%
65 years+	30,043,000	8,729,000	29.1%

Table 1. Estimate of the Prevalence of Hearing Impairments by Age Group, US, 1990-91. National Center for Health Statistics

Lin et al. (2011b) reported data from the 2005–2006 cycle of the NHANES Survey, which was the first cycle to ever incorporate hearing assessment in adults aged 70 years and older (comprising over 700 adults). The prevalence of hearing loss, defined as a speech frequency pure tone average of more than 25 dB, was 63%. In addition to age, both sex, and race emerged as the factors most strongly associated with hearing loss. Males relative to females had significantly worse hearing, and white relative to black participants had significantly poorer hearing. The prevalence of hearing loss severity by sex and race in adults aged 70 years and older, using speech frequency pure tone averages, is presented in Figure 1.

Environmental influences also play a critical role in the prevalence of hearing loss. According to the NCHS, of those reporting hearing loss, 33.7% of individuals reported that their loss is due to some sort of external noise (e.g., workplace noise), while 17.1% reported that their hearing loss was due to infection or injury. Only 4.4% reported the presence of hearing loss at birth. Likewise, among those who report 5+ years of exposure to very loud noise at work, about 18 percent of these adults show speech-frequency hearing loss in both ears. This is compared to only 5.5% of adults who report no occupational noise exposure.

Very few large-scale studies have explored the heritability and potential genetic influences of speech-relevant hearing loss in nationally representative samples. Nevertheless, of the extant research, there are a small number of interesting findings that have been recently reported. Raynor and colleagues (2009) recently reported an estimate of the genetic contributions to presbycusis through familial heritability analyses across 973 biological relative pairs from 376 families (a total of N = 3,510 participants from the Epidemiology of Hearing Loss Study). They found that heritability estimates for presbycusis, adjusted for age, sex, education level, and exposure to work noise exceeded 50%, and siblings of an affected relative were at 30% higher risk of hearing loss. Estimates of familial aggregation were higher among women than men. Though this reported heritability is quite substantial, very few studies have identified specific genes that may be partially responsible for this strong heritability, particularly with respect to speech perception.

One relevant study however comes from Xie (2015), who found that the long variant of the DRD4 gene was significantly associated with better speech recognition performance in noise, suggesting that the DRD4 polymorphism may explain some of the individual differences in speech recognition ability, though this effect was small and limited to a single condition with a competing babble speaker. Additional findings showed that this polymorphism was also related to increased working memory capacity, an effect that partially mediated the speech comprehension findings. These findings suggest a possible mechanism through which genetic polymorphisms may modulate speech comprehension—by impacting domain-general cognitive capacities such as verbal working memory maintenance.

Finally, only one study to our knowledge has attempted to provide a large-scale assessment of longitudinal trajectories of change in speech memory in older adults. My colleagues and I have recently reported results from a longitudinal investigation of propositional memory for speech in a cohort of older adults from the ACTIVE sample, a 10-year study of nearly 3,000 older adults, representing the largest longitudinal study on aging and speech memory to our knowledge to date (Payne et al., 2014). This study showed an approximate 45% decline in speech memory from the ages of 65-95 years of age. Importantly, a number of demographic and cognitive factors seemed to play a role in predicting individual differences in overall speech memory performance (including age, race, sex, risk for Alzheimer's dementia, and education level). However, the only factor to reliably predict *longitudinal decline* in speech memory over the 10-year study period was the degree of concomitant decline in (non-verbal) executive reasoning abilities. Declines in non-verbal reasoning abilities shared upwards of 75% of the variance with declines in speech memory, even after adjusting for demographic and cognitive factors. Thus, individual differences in declines in

cognitive capacity with aging play a critical role in determining speech memory.

V. The Potential Value of Text Captioning

In the following, I review a burgeoning literature suggesting that text captioning may serve as a supplement to speech processing, potentially offsetting the cognitive challenges associated with listening in noise as discussed above. Although few studies have directly examined the effects of text captioning on speech comprehension and memory, several complementary literatures exist examining the effects of audio-visual integration in speech processing, supplemental text on speech reception thresholds, comprehension of captioned television and newscasts, and the effects of captioning on the perception of ambiguous speech. These literatures provide complementary findings supporting the claim that text captioning may offset the costs of effortful listening. These findings are briefly summarized below.

An oft-cited finding in the speech processing literature is that both speech reception thresholds and speech comprehension in background noise are improved when adults are able to view the articulatory expressions of the speaker (e.g., audiovisual speech or "speech-reading"). These findings suggest that integrating cues from visual and auditory sensory channels can provide a benefit to intelligibility when speech is degraded, with an effect equivalent to an improvement in the speech-to-noise ratio of as much as 15 dB (Sumby and Pollack, 1954; Sommers & Phelps, 2016; Grant, 2002). This is critical, as studies have shown that a 1-dB improvement in SNR can correspond to upwards of a 10 % increase in perceived intelligibility (Grant and Braida, 1991). Thus, the addition of speech-reading can mean the difference between showing a sustained failure to understand speech and showing high levels of speech comprehension, especially in noisy environments. At the same time, the extant research on the integration of visual and auditory speech cues suggests that aging may be associated with a reduced capacity to rapidly integrate these multiple sensory pathways (e.g., Tye-Murray et al, 2010; Sommers & Phelps, 2016).

Are there more robust visual cues that could be used to supplement speech, besides the speaker's facial movements? Orthographic cues from simultaneously presented text would arguably provide much less ambiguous information relative to the subtle cues defined by facial articulatory production. There are a number of reasons to believe that text should serve as a supplement to speech processing. For instance, functional neuroimaging studies show heteromodal activation of auditory cortex to presentation of speech sounds and corresponding letters representing those same speech sounds in literate adults. These results suggest that efficient processing of associations between letters and speech sounds relies on neural mechanisms similar to those naturally evolved for integrating audiovisual speech (van Atteveldt et al., 2004*;* Alsius et al., 2012).

Early studies aimed to test whether speech perception could be biased by presenting simultaneous text cues. For example, Frost et al (1989) presented individual bi-syllabic words in noise with accompanying visual word presentation. Critically, the words either matched or did not match the speech, and speech sounds were either presented in background noise, or were noise bursts only (no speech was presented). Using signal detection methods, Frost and colleagues found a strong bias effect, such that visual input made the amplitude-modulated masking noise sound more like speech, but it did not improve the detectability of the speech. At the same time, however, reaction times to correct detections were reliably shorter in the matching condition, suggesting some evidence of a benefit to perception in audio-visual word recognition. Later work (e.g., Grant & Seitz 2000) showed that presenting matched orthographic text with speech in noise improved auditory word detection and provided masking release in sentences.

More recently, studies have shown that text cues can directly recalibrate the perception of ambiguous phonetic information for individual speech sounds. Keetels et al., (2016) for example showed that when participants were exposed to ambiguous speech sounds halfway between /b/ and /d/ that were combined with text (*b* or *d*), participants were more likely to categorize the test sounds in accordance with the exposed letters. These results suggest that listeners adjust their phonetic boundaries during speech perception in accordance with the disambiguating orthographic information.

Beyond word recognition, a small number of studies have begun exploring the added benefits of text captioning to the perceived clarity of degraded speech. Gordon-Salant and Callahan (2009) have shown that real-time closed captioning of speech in television improves speech intelligibility in adults with hearing impairment. This study additionally compared the benefits of hearing aids to speech recognition with and without captioning. Strikingly, although word recognition of speech was improved with the hearing aid, the effects of captioning were much stronger. In fact, hearing aids provided no appreciable benefit to word recognition when text captioning was available. Similar results have been found in studies examining the benefits of text captioning for improving word recognition in varying levels of background auditory noise (Zekveld et al., 2008; Krull & Humes, 2016; Wild, Davis, & Johnsrude, 2012, but see Stine & Wingfield, 1990). Some studies, however, have provided less robust evidence for benefits of text captioning to perceived intelligibility. For example,

Sohoglu et al., (2014) examined the effects of written text on the reported clarity of noise-vocoded speech in young normal hearing adults. They showed that perceived clarity was highest when text was presented before rather than after speech. In their study, this benefit to intelligibility was lost after a short stimulus-onset asynchrony of the text relative to the speech (i.e., if text was presented even 200ms after speech onset). However, it is important to note that the spectral vocoding used in this study resulted in a massive reduction in intelligibility relative to what is typically observed in noise-masked speech, making the task much more difficult than normal listening situations.

As reviewed above, a number of previous studies have shown that text cues may modulate the perception of degraded or ambiguous speech. Nevertheless, it is not clear what downstream benefits this improved clarity has on adults' subsequent speech memory and comprehension—that is, what speech information speakers are ultimately able to retain and use. Two studies to date are most relevant to addressing this question. In young adults, Grossman & Rahan (2017) showed that that the simultaneous presentation of congruent text benefitted subsequent recall of noise-degraded speech in adults with normal hearing. Second, Krull & Humes (2016) tested whether the presentation of partially accurate visual text from an automatic speech recognizer could be used to successfully supplement speech understanding in noise among older adults with varying levels of hearing loss. They found that combining degraded speech with partially correct text improved the number of speech "keywords" immediately recalled from speech in both young and older adults, relative to a condition with either auditory only or text only performance. However, many of the trials in the combined text and speech condition presented text with considerable errors (i.e., a "degraded text" condition, as the automatic speech recognition system was used to produce text corresponding to speech that was embedded in background noise, thus producing text errors). This approach likely resulted in the text cues appearing less reliable than what is likely to be found in actual IPCTS (Internet Protocol Captioned Telephone Service) cases. Thus, the benefits of supplemental text with speech may actually be larger than what was observed in this study, to the degree that users relied less heavily on the unreliable text cues.

The extant literature provides clear motivation supporting the idea that text captioning directly modulates perceptual processing, suggesting that listening effort may be reduced by captioning. Although these findings are promising, nearly all of the prior studies have focused exclusively on the benefits of text captioning on word perception and perceived intelligibility. Only very few have studied comprehension-relevant outcomes, such as immediate speech memory, delayed recognition memory, and comprehension accuracy performance. Moreover, no studies to date have used a text captioning method that approximates real-word IPCTS. For example, Krull and Humes (2016) used a single-word RSVP method, and Grossman and Rahan (2017) used a whole-text presentation, which allowed readers to be able to view text prior to its onset in speech, which is obviously does not approximate real-time text captioning use cases. Finally, no studies to date have examined the effects of text captioning on the real-time cognitive workload of speech processing.

VI. Conclusion

Listening to degraded speech — either due to endogenous changes in hearing acuity or to external environmental noise — is a challenging task that requires listeners to devote additional cognitive resources for successful understanding. Effortful listening is thus not merely an auditory problem, but an issue that significantly affects a variety of cognitive operations required for both linguistic and nonlinguistic tasks. The observed benefits of text captioning on perceptual processing, word perception, and perceived intelligibility suggest that listening comprehension may be improved through text captioning. However, a critical open question concerns whether and how text captioning acts to reduce the cognitive workload of effortful listening, and what direct impact captioning has on speech comprehension and memory.

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*Note: **Bolded** papers can be found at the following link https://goo.gl/3kBNuA

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APPENDIX C

An Economic Analysis of Internet Protocol Captioned Telephone Service Policy Reform

MICHELLE CONNOLLY, PH.D.

September 17, 2018

TABLE OF CONTENTS

I. TASK

I have been commissioned by CaptionCall to consider the Federal Communications Commission's (FCC or Commission) Report and Order, Declaratory Ruling, Further Notice of Proposed Rulemaking, and Notice of Inquiry in the Matter of Internet Protocol Captioned Telephone Service (*FNPRM*)[1] and analyze the economic impact of various rate methodologies that the FCC may consider using to set rates for internet protocol captioned telephone service (IP CTS).

Section II provides an executive summary of my overall conclusions. Section III provides both a brief description of the structure of IP CTS services and their regulatory environment that necessitates rate-setting. Section IV provides an overview of goals of efficient regulatory rate-setting. The remaining sections consider each the following issues, which I have been asked to address. Section V addresses the impact of submitted cost-based compensation rates for IP CTS on production and innovation. Section VI addresses the value of uniform treatment across providers including (a) the inefficiencies and perverse incentives created by tier-based compensation rates, emergent rates, and separate rates for ASR service; and (b) the value of uniformity of treatment for providers' costs, such as intellectual property costs. Section VII addresses economically superior alternatives to compensation rates based on submitted costs. Appendix A provides a summary of the current distribution of costs and market share among IP CTS providers.

[1] *Misuse of Internet Protocol (IP) Caption Telephone Service*, Report and Order, Declaratory Ruling, Further Notice of Proposed Rulemaking, and Notice of Inquiry, CG Docket Nos. 13-24 and 03-123, FCc No. 18-79 (rel. June 8, 2018) ("*Further Notice*").

II. EXECUTIVE SUMMARY

Adopting a submitted cost-based compensation rate for IP CTS would be short-sighted. Submitted cost regulation (*i.e.*, setting rates based on providers' individual or average reported costs, plus a rate of return or margin) is difficult to execute; is unlikely to yield rates that approximate those that would prevail in an unregulated market; and tends to increase, rather than decrease, overall costs.

The Commission should look to alternative means of approximating market-based rates, such as a reverse auction or a price cap. Both of these mechanisms could be used to set a non-biasing single compensation rate with improved social outcomes relative to cost-based compensation. An appropriately designed reverse auction or price cap benefits in terms of encouraging efficiency and innovation, creating greater rate certainty, and minimizing administrative burdens for providers and regulators alike.

Regardless of which rate methodology the FCC chooses, using non-uniform rates would be unproductive and inefficient. Any non-uniform treatment in compensation is an explicit decision by the regulator to bias market forces in favor of a sub-set of competitors, at the expense of the non-chosen set. Because tiered rates do not treat firms in a uniform manner, they by definition skew the market. The FCC should allow market forces to determine which firms will or will not ultimately be sufficiently competitive to succeed—rather than attempting to make this determination itself.

Finally, the FCC's treatment of costs, including intellectual property, must be uniform across providers. There is no economic or social gain that would result from the FCC's compensation rate mechanism favoring external research and development ("R&D") over in-house

R&D. Any differentiation of treatment distorts outcomes relative to an unregulated market and creates (especially if combined with tiered rates) artificial preferential treatment for firms that choose to license technology developed externally over firms that have developed technology internally.

III. THE IP CTS MARKET STRUCTURE

A. Differences from an Unregulated Market

1. In an unregulated market, equilibrium price and demand give firms appropriate signals to optimize production, investment in capital, R&D, marketing, etc.

2. In the IP CTS market, regulations cause two breaks relative to a market-based equilibrium, thus necessitating rate-setting.

3. First, Section 225 of the Communications Act of 1934, as amended, implies that IP CTS customers must pay no more for IP CTS than a fully hearing person would pay for regular telephone service.[2] As applied, this regulation implies that although IP CTS customers pay for regular voice service, they pay zero per minute costs for IP CTS.[3] This condition breaks the price sensitivity of demand for IP CTS. In other words, total demand is now solely determined by non-price determinants such as quality of service, any fixed costs faced by consumers, and marketing.

[2] Section 225 mandates that the FCC ensures that individuals who are deaf, hard of hearing, deaf-blind, or have speech disabilities have access to telecommunications relay service (TRS) "…in a manner that is functionally equivalent to the ability of a hearing individual." *See* 47 U.S.C. § 225(a)(3). The Act also requires "…that regulations prescribed to implement this section … do not discourage or impair the development of improved technology." *See* 47 U.S.C. § 225(d)(2).

[3] In general, IP CTS utilizes the voice service that the IP CTS customer separately procures. Thus, IP CTS users are already paying the same charges as fully hearing users, with no additional headroom for IP CTS-specific charges. An IP CTS consumer also purchases broadband services in order to use IP CTS.

4. Since consumers do not pay for IP CTS, in order to make IP CTS available as a Telecommunications Relay Service, the FCC has permitted IP CTS to be funded from the interstate TRS Fund.[4]

5. Second, the FCC determines the per-minute price received by providers from the interstate TRS Fund.[5] Depending on how closely this compensation rate is set relative to the rate that would be obtained in the IP CTS market in the absence of regulation, this creates a second break relative to an unregulated IP CTS market.

6. The price signal to firms is distorted whether the regulated rate is *too high or too low* relative to a market-based rate. Both outcomes create social welfare losses. Still, the impact of setting the compensation rate too low is likely worse than the impact of setting the rate too high given the risk of under-provision both in terms of quality and quantity of service provided to the hard of hearing, and the time delay and costs of bringing back efficient providers if excessively low compensation rates had previously caused excessive provider exit.

7. Among other things, these two distortions impact the overall size of the market, the present value of expected profits of existing and potential IP CTS providers, the number of providers that compete in the market, and providers' overall investment in both cost reducing and quality improving innovations.

[4] Like other internet-based forms of TRS, IP CTS is funded entirely from the interstate TRS Fund, and is not supported by state TRS funds.

[5] A minimum quality of service is required but compensation rates themselves are independent of quality of service beyond this minimum. Federal Communications Commission, Consumer Guide: Telecommunications Relay Service, https://www.fcc.gov/consumers/guides/telecommunications-relay-service-trs (retrieved Aug. 6, 2018).

8. When discussing the impact of regulations on market structure and outcomes, it is worth distinguishing between short-run static effects and long-run dynamic effects. For example, current decisions that affect the efficiency of production are determined based on current market structure (including the number of providers in the market), current technology, and current regulations. However, forward-looking decisions such as investing in capital or R&D depend on expected future market structure, technology, and regulations. Because their impact is compounded over time, long-run dynamic effects of these forward-looking decisions generally dwarf short-run static effects.

B. Current Distribution of Costs and Market Share

9. There are two points, worth emphasizing, about the observed distribution of cost and market share in the IP CTS market. First, a wide distribution of provider costs and market share can be the result of many factors, not just economies of scale. Second, while economies of scale are present in the IP CTS market, a majority of providers are likely to already be producing at levels where they have already exhausted their scale economies. *See* Appendix A for a full discussion of these two points.

IV. GOALS FOR EFFICIENT RATE SETTING

10. To minimize economic losses that arise from market distortions, provider compensation must, as closely as possible, replicate the *market structure* and resulting rates that would be present absent regulation. Namely, the manner and level at which providers are compensated should be as similar as possible to that which would exist in the unregulated market. Setting compensation in such a manner will lead to a market in which the *number of firms* and *the manner in which they compete* is most similar to what would prevail absent regulation. An appropriately chosen single rate will minimize the impact on the present value of expected profits

of providers and potential providers. It will also foster production efficiency and overall rates of innovation that are close to socially optimal levels.

11. To best approximate the structure and rate levels of an unregulated market, the Commission should be guided by the following four principles.

- A regulated rate should not create perverse incentives for innovation.
- The fact that the rate is regulated should not unduly increase the uncertainty of compensation.
- A regulated rate—like a market rate—should treat all firms in a uniform manner. If firms provide the same undifferentiated goods or services, a regulated rate should not favor any firm or set of firms over others.
- A regulated rate should be set so as to minimize reporting, auditing, and administrative costs.

A. Avoid Perverse Incentives for Innovation

12. As discussed in Section V, a rate set based on provider-submitted costs plus a rate-of-return or margin distorts the incentives to invest in R&D for all participants since the return to successful cost reducing innovation is reduced due to the subsequent endogenous reduction in compensation. Even submitted-cost-based compensation based on the average submitted costs across providers still lowers incentives to undertake R&D since providers—especially larger providers—know that their own costs impact the average provider cost calculation.

B. Rate Certainty

13. Uncertainty in any market leads to reductions in investments since much capital investment is irreversible. As such, ideal rate-setting mechanisms should be stable, well-defined, and have clearly defined adjustment mechanisms.

14. It is costly to have frequent adjustments in the rate-setting mechanism due to the high level of uncertainty it creates. As such, it is important in this proceeding that the FCC chooses a rate-setting mechanism that will not need to be completely re-evaluated after a few years due to observed problems—as has occurred with other submitted-cost-based compensation regulations.

15. It is also costly to have annually adjusting rates, especially in the case of cost-based compensation, since this increases uncertainty over the likely final compensation rate relative to a rate that is known to be fixed over a given period of time,[6] and since it is optimal in such a case to give providers incentives to reduce costs at least during the time interval when a rate is set. With annually adjusting submitted-cost-based compensation, incentives to reduce costs are severely diminished. If a longer period of time is allowed before the rate is reset, then providers will have at least some incentives to reduce costs during that period and have a higher probability of having time to earn some marginal profits from undertaking and deploying cost reducing innovations.

C. Uniformity of Treatment

16. In an unregulated market, firms are treated in a uniform fashion. Without differentiation, identical goods or services garner the same market prices as one another. The consumer will not pay more simply because a firm is smaller; the consumer will not pay less simply

[6] The uncertainty with annual adjustments is greater since firms will be trying to both anticipate other firms' costs, as well as the possible entry or exit of firms each year, which would also impact the compensation rate.

because a firm does its research in-house. Similarly, firms providing the same, undifferentiated service must be treated in an equal fashion in a regulated market. Otherwise, regulated compensation schemes inherently bias the market in favor of one set of providers over another.

D. Minimize Reporting, Auditing, and Administrative Costs and Directly Unproductive Profit-Seeking (DUP) Activities

17. Costs associated with the gathering, reporting, and auditing of costs, especially on an annual basis, are significant. Providers must collect and report very specific data to the administration. The TRS Fund administrator is responsible for data collection, auditing, and administration.[7] The FCC would need to devote significant staff and resources to repeatedly address compensability of costs, the appropriate level of return/margins, etc. Resources devoted to such activities (both by providers and the TRS Fund) do not lead to the production of goods or services. To the extent that such reporting is required, it must be streamlined and systematized in order to reduce these costs.

18. With any cost-based compensation there is continual questioning over the inclusion or exclusion of specific costs in the determination of "reasonable" costs. Frequent petitions and rulings on the reasonableness of costs is a socially costly activity both because of the resources used in such activities and because of the uncertainty these create for providers. This uncertainty has a negative impact on investment for all providers.

[7] *See* Rolka Loube Associates LLC, Interstate Telecommunications Relay Services Fund Payment Formula and Fund Size Estimate, CG Docket Nos. 03-123 and 10-51 (Apr. 30, 2018) ("Rolka Loube Report"). The Rolka Loube Report estimates administrative costs, etc. moving forward—even if the current MARS structure remains. These estimated costs will likely increase further if the FCC truly moves to cost-based compensation.

19. Moreover, cost-based compensation creates incentives for providers to petition for the inclusion or exclusion of certain costs *to strategically help their position relative to other competitors*.[8] Costs incurred for such purposes are directly unproductive, profit-seeking (DUP) activities which unambiguously lower social welfare.[9]

20. Rather than relying on a repeating compensation rate determination based on provider-submitted costs, the FCC should instead choose a compensation mechanism with the least administrative costs (*i.e.*, with the lowest informational need for the FCC), with less uncertainty and lobbying over the compensation mechanism itself, and with fewer incentives to undertake DUP activities to strategically interfere in the *relative* profitability across firms. As will be discussed further below, a reverse auction or price cap are two mechanisms that could achieve these goals more readily than any submitted cost-based compensation mechanism.

[8] This will be particularly pronounced if tiered rates based on submitted-costs are used. Moreover, this approach will also be used by providers who are seeking to convince the FCC of the need for tiered rates if the exclusion of certain costs amplifies perceived differences in costs across providers. For example, ClearCaptions uses the Rolka Loube estimates for CaptionCall, which exclude CaptionCall's costs for intellectual property, in its graphs intended to suggest that a single rate would lead to excessive profits for CaptionCall and that scale is the primary reason why CaptionCall has such lower costs. In reality, when intellectual property costs are treated in a uniform fashion, the maximum difference in provider estimated cost per minute falls from ***HIGHLY CONFIDENTIAL*** *** [redacted] ***END HIGHLY CONFIDENTIAL*** Moreover, as discussed in Appendix A, existing cost differences between providers are unlikely to be primarily driven by economies of scale. *See* Letter from Paul C. Besozzi, Counsel to ClearCaptions, LLC to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 03-123 and 13-24, Attachment at Slides 4-6 (filed Oct. 2, 2017).

[9] *See* Jagdish N. Bhagwati, *Directly Unproductive, Profit-Seeking (DUP) Activities*, 90 J. Pol. Econ. 988 (1982).

V. INEFFICIENCY OF SUBMITTED COST-BASED COMPENSATION

21. In adopting the interim IP CTS compensation rates, the FCC looked at the difference between the current 2017-2018 MARS rate and providers' average costs based on data submitted to the Fund Administrator. The FCC further announced a "glide path" based on continued annual reductions in the compensation rate until the rate reaches a cost-based rate, potentially based on average submitted IP CTS expenses.

22. This section focuses on the inherent flaws of using provider-submitted costs to determine IP CTS compensation rates. These flaws are present whether submitted costs are used to determine the rate for a single provider or the average or median cost across providers.[10]

23. Setting rates based on submitted (or "allowed") costs presents a number of well-recognized problems. A rate-setting mechanism based on submitted costs requires a regulator to establish a system of accounting for costs, and a system for allocating common costs. The allocation of common costs among services (regulated or non-regulated) is inherently arbitrary.[11] "[B]ecause the numbers that emerge from the [cost allocation] process are arbitrary, any prices determined by the regulator with their aid can only have a random relation to the prices that would emerge in competitive markets."[12] Regulators also determine what costs are allowable, which

[10] These flaws would also be present if the FCC were to use submitted costs to set tiered rates or a different rate for emergent providers. As discussed in Section VI.A, adopting non-uniform rates of any kind is problematic for additional reasons.

[11] *See* W. Baumol, M. Koehn, & R. Willig, *How Arbitrary is 'Arbitrary'? – Or, Toward the Deserved Demise of Full Cost Allocation*, Pub. Utils. Fortnightly, Sept. 3, 1987, at 16 ("When the activities of a firm benefit from substantial common investments or substantial common outlays (or both), there is no way to calculate a rate of return for any or all of the company's individual activities, one by one. Indeed, the difficulty is not that we cannot determine these numbers, but that such numbers themselves are necessarily figments of the imagination.")

[12] *Id.* at 17.

requires a judgment as to which costs the regulated firm should have prudently incurred, as well as which costs are attributable to the supported service. Finally, regulators must select an appropriate rate of return or profit margin, again based on limited knowledge of what would have occurred in the unregulated market.

24. In the discussions bellow, I abstract from potential differences in submitted versus actual costs, difficulties in determining costs, and the appropriate level of return. Instead, I focus purely on distortions caused by compensation based on submitted costs, even if perfectly measured and reported.[13]

25. Market distortions caused by submitted cost-based compensation stem from both the short-run and long-run consequences of the fact that the firm knows that changes in its costs will change the rates it is permitted to receive. These distortions include:

- reduced incentives to currently produce efficiently;
- reduced incentives to innovate so as to lower future production costs;
- reduced innovation, all else equal, due to greater uncertainties, especially in the case of annually revised submitted cost-based compensation rates;
- excessive incentives to increase market share and the overall market size through spending on marketing, outreach, and quality-improving innovation;

[13] Because I abstract from the question of whether costs are correctly measured and reported, I use the term "submitted costs" to reflect a system of rate-setting based on cost accounting and a permitted rate-of-return or margin.

- over entry of providers leading to potentially reduced economies of scale (even if all providers are equally efficient);
- over entry of inefficient providers leading to additional productivity losses and further reduced incentives to innovate on the part of efficient providers;
- excessive incentives to undertake DUP activities; and
- excessive resources lost to reporting, auditing, and administration.

26. Distortions caused by submitted cost-based compensation rates are greatest in cases of individual provider compensation based on individual costs. Relative to individual compensation, tiered compensation is marginally better—assuming there is always more than one provider per tier. Still, the distortions are only marginally reduced relative to individual compensation rates. A single compensation rate based on average provider costs is economically superior to tiered compensation rates, but still creates significant distortions.

Distortion of Supplier Incentives with Submitted Cost-Based Compensation

27. The intuition for a key distortion, namely reduced incentives to invest in more efficient production or in cost reducing innovation, caused by submitted cost-based compensation is most easily illustrated in the setting of a single supplier. Consider a submitted cost-based compensation mechanism updated annually in response to reported costs of this single supplier. In such a situation, the supplier has very little incentive to invest in anything to reduce its current

or future production costs since doing so would immediately lead to a reduced compensation in the following year.[14]

28. Coleman Bazelon and Brent Lutes (2017) reinforce this concept in the case of multiple providers:

> Understanding the mechanism that can drive reimbursement rates down highlights the need to have a rate methodology that is based on competitive forces. To that end, rates that are directly linked to costs skew the incentives of providers. When providers are faced with decisions to reduce costs, those decisions will be greatly influenced by the portion of the costs-savings that goes towards the bottom line. When reducing costs also sufficiently reduces revenue, it is not rational to expect providers to reduce costs. This fact remains true whether rates are based on marginal or average costs and irrespective of how many rate tiers complicate the methodology. A rate methodology should simulate the outcome of a competitive market.[15]

29. Given that customers do not directly pay for IP CTS, providers can gain market share through higher quality of service, lower fixed costs to consumers, and/or marketing but not through price. In a cost-based compensation setting, any provider receiving compensation yielding positive per unit profit has an artificially heightened incentive to increase sales relative to optimal sales in an unregulated market since doing so raises expected profits (because of the combination

[14] If the research and development costs of attempting to innovate to reduce costs are greater than the expected marginal gain in profit (i.e. conditional on successful innovation) for the time period (less than one year) before rates change, then the provider optimally does not put any money towards innovation.

[15] Coleman Bazelon & Brent Lutes, *Telecommunications Relay Services for Individuals who are Deaf or Hard of Hearing: Market and Policy Analyses* (white paper prepared for Hamilton Relay, p. 42 (2017)).

of increased revenue and the fact that additional expenditures spent to increase sales will increase submitted costs and eventual compensation).[16]

30. The more successful that higher cost firms are at increasing their market share, the more this leads to resources moving away from more efficient firms. Additionally, the more successful higher cost firms are at increasing the total size of the market, the higher the social costs (TRS Fund costs) both since the total size of the market is increased, all else equal, and additional resources will be needed per minute of service (since the expenditures used to achieve increased sales in turn lead to higher cost-based compensation in the future).

31. This creates the risk that firms will be interested in increasing market share, as well as increasing the market as a whole, beyond the level that would be profit maximizing in an unregulated market. As a consequence, marketing expenditures under a submitted cost-based compensation rate will be greater than that under a market-based/incentive compatible rate.

32. Hence, distortions caused by submitted cost-based compensation rates lead to reduced incentives to produce efficiently for a given technology level, reduced incentives to invest in cost-reducing technological innovation and deployment to lower future costs, and excessive

[16] While this might also lead firms to also raise quality in order to both raise sales and submitted costs, this is neither guaranteed, nor socially optimal if it occurs in this situation. Assuming that both R&D and marketing costs are equally treated in submitted costs (and therefore have the same impact on future submitted cost-based compensation), it is likely that the marginal cost of investing in quality-improving R&D would be greater than that of investing in marketing—relative to expected marginal increases in profits due to sales. As such, the distortion caused by submitted cost-based compensation in situations of overly high compensation, will likely lead to over expenditures on marketing before leading to over expenditures on quality-improving R&D. To the extent that such a setting would lead to the over provision of quality, it would still be socially sub-optimal since the cost of the innovation would be greater than the social benefit created by it. *See* Katz (2012), 60 at p.40.

incentives to increase firm sales through non-price dimensions, since customers always face a marginal cost of zero regardless of provider.

Subsidized Entry of Inefficient Firms

33. Submitted cost-based compensation—even when based on average or median costs—encourages and sustains entry of firms beyond socially optimal free market levels.[17]

34. Optimal levels of firm entry are particularly important in industries with increasing returns to scale since optimal firm entry leads to more efficient economies of scale. This likely holds even if these economies are exhausted at relatively low scales of production since excessive firm entry leads to over-replication of fixed costs and is likely to lead to at least some firms producing at sufficiently lower scales so as to yield higher average costs.[18]

35. If over-entry additionally leads to the entry of less efficient firms, then the shift of some production from low cost producers to high cost producers will further increase both total and average costs of production. All else equal, both of these factors also lead to higher production costs in the future as over entry of firms (especially if by less efficient firms) reduces incentives for innovation for efficient firms based on the fact that they know they will in the future artificially lose market share to inefficient, subsidized entrants.

[17] In an unregulated market, more efficient firms can increase their market share (and expected profits) through not only quality, but also, price competition. This would likely force more firms to exit the market relative to average-cost based compensation.

[18] This can occur even if all firms are equally efficient. *See* Ignatius J. Hortmann & James R. Markusen, *Up the Average Cost Curve: Inefficient Entry and the New Protectionism*, 20 J. Int'l Econ. 225 (1986).

36. All else equal, artificially inflated entry *lowers* the level of innovation since it directly moves resources away from more efficient firms and reduces the profit motive for investing in R&D. Over time, this raises the average cost of IP CTS service.

37. With a single average cost-based compensation rate, firms have greater incentive to invest in lowering costs *relative* to a tiered or individual provider rate. However, there is still the issue that firms (especially large firms who are more heavily weighted in the calculation of average industry costs) know that their costs will influence compensation. This discourages firms from innovating or adopting more efficient technologies. With average-cost compensation, competition (including threat of competition) still pushes innovations, but, all else equal, has a diminished impact due to the internalization of a firm's impact on the average-cost estimate.

Artificially High Burden on TRS Fund

38. While a submitted cost-based compensation mechanism is being put forth as a means by which to reduce the overall burden of IP CTS on the TRS fund, imposing an annually readjusting submitted cost-based rate is not the most efficient means by which to reduce the current and, more importantly, the future burden.

39. Given the previously discussed economic distortions caused by submitted cost-based compensation mechanisms, there are large social and economic costs of adopting an annually adjusting submitted cost-based mechanism rather than attempting to find a more market-based approach. Under submitted cost-based compensation, total expenditures by the TRS fund are directly dependent on realized cost. Hence, distortions created by submitted cost-based compensation that raise production costs, also raise the burden on the TRS fund.

Previously Recognized Challenges Caused by Cost-Based Compensation

40. The FCC has migrated away from submitted cost-based ratemaking over the past 30 years. Beginning with AT&T's then-regulated long distance rates, the FCC shifted from submitted cost-based regulation to price caps in 1989, followed in 1990 by the largest local exchange carriers.[19] At the time, the FCC did so because, although "in theory, rate of return is intended to replicate competitive market results," "there are many differences in the manner in which rate of return regulation competitive forces operate."[20] "The dynamic process that produces socially beneficial results in a competitive environment is strongly suppressed [by rate of return regulation]. In fact, rather than encourage socially beneficial behavior by the regulated firm, rate of return actually discourages it." [21] The Commission also found that "[A]dministering rate-of-return regulation . . . is a difficult and complex process . . . built on the premise that a regulator can determine accurately what costs are necessary to deliver service."[22]

41. The FCC has continued to evaluate ways to migrate to other forms of incentive-based regulation. In 2011, the FCC migrated away from submitted costs as a basis for setting

[19] *See In re Policy and Rules Concerning Rates for Dominant Carriers*, Report and Order and Second Further Notice of Proposed Rulemaking, 4 FCC Rcd 2873 (1989) ("*AT&T Price Cap Order*") (establishing price caps for AT&T as the dominant interexchange carrier); *In re Policy and Rules Concerning Rates for Dominant Carriers*, Second Report and Order, 5 FCC Rcd 6786 (1990) (establishing price caps for the largest dominant local exchange carriers).

[20] AT&T Price Cap Order, 4 FCC Rcd at 2889 ¶ 29.

[21] AT&T Price Cap Order ¶ 29.

[22] AT&T Price Cap Order ¶ 31.

interstate switched access rates for all carriers, including those that had previously set rates for interstate switched access using a rate-of-return methodology.[23]

42. Within its universal service mechanisms, the FCC has increasingly shifted towards incentive-based mechanisms.[24] After the 1996 Act, as part of its first efforts at shifting implicit support into explicit mechanisms, the FCC used a cost model, rather than submitted costs, to set levels for high cost support for the largest carriers (which had shifted to price caps for their interstate switched and special access rates).[25] After its 2011 USF/ICC Transformation Order, the FCC adopted a new fiber-to-the-home cost model to determine the support levels that the largest price cap carriers would receive for deploying broadband.[26] These carriers had a "right of first refusal" and could accept or decline support at the state level. In areas where these larger carriers declined the cost-model support, the FCC conducted a descending clock reverse auction to distribute universal service support on a technology neutral basis.[27] In 2016, the Commission followed a similar path to permit carriers that had previously been receiving universal service

[23] *In re Connect America Fund*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17,663, 17,934 ¶ 801 (2011) ("*USF Transformation Order*") (capping all interstate access rates).

[24] This shift has not been complete, as many smaller carriers still receive universal service support calculated on the basis of submitted costs.

[25] *See In Re Federal-State Joint Board on Universal Service*, Ninth Report & Order and Eighteenth Order on Reconsideration, 14 FCC Rcd 20,432 (1999), *review granted and rev'd by Qwest Corp. v. FCC*, 258 F.3d 1191 (10th Cir. 2001). The shift away from submitted costs for these carrier was not full, due to a hold-harmless mechanism.

[26] USF Transformation Order, 26 FCC Rcd. at 17,725 ¶ 156; *In re Connect America Fund*, Report and Order, 29 FCC Rcd 15,644 (2014).

[27] *Connect America Fund Phase II Auction et al.*, Public Notice, DA 18-887, AU Docket No. 17-182, WC Docket No. 10-90 (rel. Aug. 28, 2018).

support calculated on submitted costs voluntarily to receive amounts determined from cost model provided that they increased broadband deployment.[28]

43. Sappington and Weisman (2010) document the steady decline of cost-based rate-of-return regulation in the US telecommunications industry generally. As of 1985, 50 state telecommunications regulatory agencies were using rate-of-return regulations. By 2007, only three state agencies still used rate-of-return regulation (*see* Table 1). In contrast, price cap regulation, which was not used by any of these agencies in 1985, was used by 33 agencies in 2007:[29]

> Many state regulators in the US employed [price cap regulation] by the turn of the century. Indeed, 40 of the 50 states (80%) employed [price cap regulation] in 2003. The [price cap regulation] plans adopted during this period implemented fairly long time periods between reviews (often 4 or 5 years) and afforded the firm substantial pricing flexibility. Price controls often were applied to a diminishing set of services, as competitive forces were now helping to constrain prices on many telecommunications services. The strengthening of competitive forces also reduced the need for regulators to predict the extent to which regulated suppliers could reasonably achieve more rapid productivity growth than other firms in the economy and to adjust the X factor accordingly. Instead, regulators often set the X factor equal to the rate of inflation (as they had implicitly done under RCM [rate case moratoria]), thereby simply requiring prices not to increase, on average.[30]

[28] *In re Connect America Fund*, Report and Order, Order and Order on Reconsideration, and Further Notice of Proposed Rulemaking, 31 FCC Rcd 3087, 3096 ¶ 20 et seq. (2016) (adopting voluntary model-based support for rate-of-return carriers); *see also* CAF - A-CAM 2.3.2 - Authorization Report Version 3.0 (Includes Version 1.0 & 2.0) (July 20, 2018), https://docs.fcc.gov/public/attachments/DOC-352788A1.xlsx.

[29] David E.M. Sappington & Dennis L. Weisman, *Price cap regulation: what have we learned from 25 years of experience in the telecommunications industry?*, 38 J. Reg. Econ. 227 (2010).

[30] Ibid, pp. 233-234.

Table 1. Number of US State Telecommunications Regulatory Agencies Employing the Identified Regulatory Policy[31]

Year	Rate of Return Regulation	Earnings Sharing Regulation	Rate Case Moratoria	Price Cap Regulation
1985	50	0	0	0
1987	36	3	10	0
1990	23	14	9	1
1993	17	22	5	3
1995	18	17	3	9
1998	13	2	3	30
2000	7	1	1	39
2003	6	0	0	40
2007	3	0	0	33

Source: Sappington and Weisman (2010), Table 2.

VI. UNIFORM TREATMENT NEEDED FOR ECONOMIC EFFICIENCY

A. Non-Uniform Compensation Rates Amplify Social Costs and Distortions to Innovation

44. To the extent that regulation is necessary, it should not artificially or arbitrarily determine that one set of firms should be favored over others. Making distinctions among firms is the role of the market, not the regulator. In a market setting, all firms that provide the same undifferentiated service face the same market pressures.

45. By implementing a single, uniform compensation rate, the FCC can avoid arbitrarily favoring of a subset of firms and allow remaining market forces to push outcomes towards the most efficient market outcome possible (other than having no regulation).

[31] The total number of price-cap regulations fell after 2003 due to increasing deregulation of retail telecommunication services in the U.S. Ibid, p. 234.

46. In contrast, non-uniform compensation rates, such as tiered rates, reflect an explicit choice by the regulator to insulate a chosen set of firms from competitive market pressures at the expense of the remaining firms and the consumers from whom support is collected. As such, tiered rates—whether based on scale of production, age of firm (emergent), or type of technology used—are inherently economically inefficient and should not be considered.

47. Non-uniform rates lead to general economic inefficiency by distorting market-based competition and providing excessively distorted price signals/incentives to providers. This causes both current and future resources to be inappropriately allocated, and ultimately leads to an overuse/waste of societal resources relative to what a market would require to provide the same or better quality and quantity of service in the absence of tiered rates.

48. All requests for tiered rate structures are fundamentally arguing that the FCC and U.S. consumers paying into the TRS fund should be offering above market compensation to a specific group of firms identified as requiring special protection. This extra cushioning is most often requested by inefficient firms under the guise that temporary *insulation from market forces* will allow these firms to expand and eventually become efficient.

49. There are four fundamental flaws in this reasoning:

a. Tiers assume that the U.S. does not have a functioning capital market.

b. Tiers assume that subsidized and protected firms will ever have the proper incentive/competitive pressures to become efficient and grow out of their "infant" status.

c. Tiers presume that the only reason that a firm has high costs and/or low volume of production is that they are still learning or that something external to the firm is

preventing it from achieving higher scale and lower costs, when in reality, high costs and low market share can be driven by differences in management, technology, investments, etc.[32]

d. Tiers assume that high cost providers have not yet reached a volume in which their economies of scale have been for the most part already exhausted.

50. As the NPRM does not present tiered rates for IP CTS as a leading proposal, I will leave more detailed discussion of tiered rates for potential future discussion.

B. Uniform Treatment of Intellectual Property Costs

51. To the extent that the regulators rely on any cost-based rate-setting methodology, costs must be treated uniformly in order to avoid excessively favoring/disfavoring one industry over another or one set of firms in a market over another.

52. Table 3 in Appendix A, demonstrates how a distortionary treatment of intellectual property, based on whether or not it was developed in-house, leads to dramatically biased and incorrect provider cost evaluations. When the CaptionCall licensing fee is properly included, the range of the estimated average cost per minute across firms is ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** When it is excluded, the estimated range is absurdly large, ranging from ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** Even if one were unaware that markets treat firms in a uniform fashion based on the goods or services they produce, at face value, a range of estimated average costs per minute ******BEGIN HIGHLY***

[32] Michael Katz (Mar. 9, 2012) "An Economic Analysis of VRS Policy Reform," p. 34. Chad Syverson (2004), "Market Structure and Productivity: A Concrete Example," *Journal of Political Economy*, 112(6): 1181-1222.

CONFIDENTIAL [redacted] [redacted] ***END HIGHLY CONFIDENTIAL*** should make one question the validity of the assumptions behind the creation of this measure.[33]

53. In a tiered-rate setting, inappropriately non-uniform treatment of intellectual property across firms is a policy to explicitly favor firms licensing external intellectual property at the expense of firms who are vertically integrated. Even in the absence of tiers, such treatment of allowable costs, in an average cost-based setting, would lead to compensation rates significantly below the price which would prevail in an unregulated market. As such, it would be explicitly disfavoring the IP CTS market relative to all other markets.

54. If the FCC decides to use any form of a mechanism based on submitted costs to determine the compensation rate in IP CTS, the treatment of intellectual property must be uniform across providers. Specifically, the cost of using intellectual property is and must be treated equally regardless of whether the intellectual property is owned internally or is licensed from an outside firm. Any differentiation of treatment distorts outcomes relative to an unregulated market and (if combined with tiered rates) creates artificial preferential treatment for firms choosing to license technology developed externally over firms who have developed technology internally.

[33] It is worth noting that since CapTel licenses services to both Hamilton and Sprint, it is producing at a scale that is likely just shy of ***BEGIN HIGHLY CONFIDENTIAL*** [redacted] ***END HIGHLY CONFIDENTIAL*** minutes. Moreover, given the nature of CA services, economies of scale are likely to be exhausted at much lower levels of production. *See* Appendix A for more detailed discussion.

55. As previously discussed, there is significant evidence that most innovations are carried out by established producers who systematically undertake in-house R&D.[34] There is no economic or social gain for the FCC's compensation rate mechanism to be favoring external R&D over in-house R&D.

56. Market mechanisms allow firms to optimally decide on whether they wish to conduct their own R&D, rely on external R&D, or do some combination of the two. This is a question from the firm's perspective of the optimality of being vertically integrated or not. Imposing preferential treatment in favor of either type of R&D simply creates an additional distortion in the marketplace. Such a distortion can only lead to a less optimal allocation of R&D resources and lower rates of innovation. Moreover, such a policy would artificially bias firm decisions against vertical integration. Given the potential economic benefits of vertical integration, it would set a dangerous precedent to impose a policy which explicitly inhibits rational vertical integration.

57. The concept of transfer pricing within vertically integrated firms is standard and has a rather long history of regulatory supervision to ensure appropriate tax treatments, especially in the case of firms with subsidiaries in other countries. U.S. Transfer Pricing Regulations apply an arm's length standard for the pricing of transactions within and between enterprises under common ownership. Specifically, the price assigned to the transfer or use of tangible property,

[34] *See* Pietro Peretto, *Sunk Costs, Market Structure, and Growth*, 37 Int'l Econ. Rev. 897 (1996), and Alvin K. Klevorick, Richard C. Levin, Richard R. Nelson, & Sidney G. Winter, *On the Sources and Significance of Interindustry Differences in Technological Opportunity*, (Cowles Foundation Discussion Paper 1052 1993).

intangible property, and services between related or controlled parties must be priced as if the related parties were independent, unrelated parties.

58. In the case of the Sorenson IP license fee, the arm's length price would be the price at which Sorenson IP would be able to license this intellectual property to a third party. U.S. Transfer Pricing Regulations allow different methods to best determine the appropriate arm's length price. Based on the accepted methods, Deloitte determined that the most appropriate method for determining the arm's length price for the intellectual property provided by Sorenson IP Holdings, LLC to Sorenson OpCo/CaptionCall, LLC was ******BEGIN CONFIDENTIAL******

[redacted] ******END CONFIDENTIAL******.[35]

59. The Deloitte study on the appropriate arm's length price for the Sorenson intellectual property was undertaken for tax purposes. Based on ******BEGIN CONFIDENTIAL****** [redacted] ******END CONFIDENTIAL******, Deloitte concluded:

******BEGIN CONFIDENTIAL****** [redacted] ******END CONFIDENTIAL******[36]

60. When these intellectual property costs are appropriately considered, estimated average costs for CaptionCall ******BEGIN HIGHLY CONFIDENTIAL****** [redacted] ******END***

[35] Deloitte, *Sorenson Communications, LLC: CaptionCall Transfer Pricing Study*, 17 (Aug. 29, 2017).

[36] Ibid, p. 4.

HIGHLY CONFIDENTIAL*** Given the known economic distortions that would be caused by using a submitted cost-based compensation scheme, and the standard consideration of costs within a vertically integrated firm, there is no economic justification for the non-uniform treatment of intellectual property costs across IP CTS providers.

VII. SUPERIORITY OF REVERSE AUCTION OR PRICE CAP

61. This section considers alternative IP CTS rate-setting methodologies that may result in greater efficiency and more positive outcomes overall. Relative to cost-based compensation rates, market-based compensation rates create fewer distortions and lead to higher overall social welfare.

62. Among possible mechanisms that could be used to determine market-based compensation rates are reverse auctions or price cap regulations with clearly defined adjustment rates. Each of these alternatives is discussed below.

A. Reverse Auction

63. An appropriately designed reverse auction mechanism could effectively approximate unregulated market outcomes.

64. Although detailing an appropriate reverse auction design is beyond the scope of my report, benefits of a properly designed reverse auction include: (1) identifying and allocating resources to efficient providers;[37] (2) encouraging higher overall efficiency and innovation in the market;[38] (3) minimizing administrative burdens for regulators and providers because the auction

[37] *See* R.H. Coase, *The Federal Communications Commission*, 2 J. Law & Econ. 1 (1959).

[38] Note that preferential treatments in auctions for small bidders act much like tiered compensation rates and lead to inefficient market allocation. *See* Michelle P. Connolly et al., *The Evolution of*

itself sets the compensation rate; and (4) decreasing the uncertainty faced by providers or potential providers as to future changes in compensation rate mechanisms and in the determination of compensable costs and returns or margins.

B. Price Cap Regulation

65. A price cap would also be economically superior to continuously adjusting submitted cost-based mechanisms. A price cap could be used to set IP CTS rates on an ongoing basis if the FCC decides not to undertake a reverse auction. Alternately, even if the FCC does ultimately plan to use a reverse auction to determine the IP CTS compensation rate, a price cap could be used on an interim basis while the reverse auction is being designed and implemented.

66. In the IP CTS market, price cap regulation has significant advantages over individual cost/tiered or even average cost-based compensation. Sappington and Weisman (2010) explain price cap regulation:

> Under [price cap regulation], the regulator initially studies the firm's capabilities and its operating environment in order to determine the revenues that would likely allow the firm to secure reasonable earnings. When [price cap regulation] is first implemented, the regulator often implements rate rebalancing, modifying the rate structure to align prices more closely with underlying costs. The regulator then sets the maximum rate at which the inflation-adjusted prices of the firm's regulated services can increase, on average, each year until the [price cap regulation] plan is reviewed. Formally, [price cap regulation] often restricts annual average price increases to be less than the economy-wide rate of price inflation by a specified amount, called the "X factor." To illustrate, suppose the X factor is 3% and the economy-wide inflation rate is 2% during each of the 4 years before the scheduled review of a [price cap regulation] plan. Under this plan, the regulated firm would be required to reduce the prices that it charges, on average, by 1% annually during the plan (since 2% − 3% = −1%).[39]

U.S. Spectrum Values Over Time (Economic Research Initiatives at Duke (ERID) Working Paper No. 247, Feb. 15, 2018), https://ssrn.com/abstract=2982624.

[39] Sappington and Weisman (2010), p. 229 (footnotes omitted).

67. Relative to cost-based compensation, price cap regulation with a reasonable price cap period breaks the link between realized costs and compensation (at least temporarily). This is because the required rate of decline in inflation-adjusted prices, the "X factor," is fixed until the next scheduled review date. A price cap with an appropriate X factor encourages innovation and cost reduction relative to cost-based compensation by allowing actual returns to diverge from anticipated returns, until the scheduled date of review.

68. Price cap regulation thus provides additional market-based pressure and incentives relative to submitted cost-based (or rate of return) compensation for less efficient firms to become more efficient and cut costs. A less efficient firm that reduces costs under a price cap increases its earnings. At the same time, a less efficient firm cannot increase its rates by increasing its costs.

69. Ultimately, these effects lower the average market cost and lower the overall burden on the TRS Fund.

70. A price cap with a sufficiently long price cap period has the additional benefit of providing rate certainty, which in turn encourages providers to make long term investments in technological development and innovation, which can lead to further efficiency gains.

71. In order to design a price cap that has these benefits, the FCC must determine an appropriate initializing rate, "X factor," and price cap period.

72. An appropriate determination of the initializing rate could be based on true current average cost (plus margin), where there is a uniform treatment of costs across providers.[40]

[40] The 2018 FCC Report and Order suggests using the same "zone of reasonableness" of a 7.6 to 12.35% margin established in the 2017 VRS Compensation Order. *In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*; Order, 32 FCC Rcd 5142 (CGB 2017).

However, if industry-average submitted costs are used to initialize a price cap, the Commission must also be cognizant of the potential for errors and distortions in using submitted costs, as discussed in Section V, above. Additionally, as previously discussed, any approach that relies on average costs must treat providers' costs uniformly.

73. The FCC must also determine an appropriate means of adjusting the price cap. The initial rate should be adjusted automatically for inflation as well as a predetermined X factor reflecting anticipated productivity growth. In setting the X factor, it is likely preferable to err in the direction of setting it too low, rather than too high. In this regard, the Commission has already had experience once with setting an overly aggressive X factor for IP Relay, for which rates then had to be increased to preserve service.[41]

74. Importantly, the X factor must also be set for a multiyear period. Historically, the FCC has set price caps for review after three to five years.[42] The longer the period, the less impact

[41] In the *2013 Rate Order* the FCC, in response to a Rolka Loube recommendation, cut the IP Relay rate substantially and then also declared a high X-factor to reduce rates year over year. *See In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Order, 28 FCC Rcd 9219, 9221-25 ¶¶ 10-20 (CGB 2013). Later, after all providers except Sprint exited the market, the FCC issued an order, "based on emergency circumstances," raising the IP Relay rate back above where it had been in order to keep Sprint from leaving IP Relay, which would have left no IP Relay providers. *In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Order, 29 FCC Rcd 16,273 (CGB 2014).

[42] *See In re Structure and Practices of the Video Relay Service Program*, Report and Order and Order, 32 FCC Rcd 5891, 5921 ¶ 58 (2017) (adopting a four-year rate period because it would give "providers' certainty regarding the future applicable rate"); *In re Access Charge Reform*, Sixth Report and Order in CC Docket Nos. 96-262 and 94-1 Report and Order in CC Docket No. 99-249 Eleventh Report and Order in CC Docket No. 96-45, 15 FCC Rcd 12,962 (2000) (adopting five-year price cap, which has been effectively extended indefinitely), *review granted and rev'd in part by by Texas Office of Public Utility Counsel v. FCC*, 265 F.3d 313 (5th Cir. 2001); *see also In re Price Cap Performance Review for Local Exch. Carriers*, First Report and Order, 10 FCC

that potential for the subsequent review will have on a firm's incentives to reduce costs or engage in socially beneficial investments. By contrast, if the FCC were to reassess the X factor (or reinitialize the rate) more frequently based on observed innovations, price cap regulation would end up replicating the negative impact of cost-based compensation with respect to efficiency, innovation, and administrative burdens. Given the length of time required to see returns from R&D, I would argue that if used, a price cap should be set for a minimum of three to five years.

VIII. CONCLUSION

75. In the absence of market failures, free markets provide appropriate signals to firms and consumers about the relative value of goods/services. Decision-making based on price/quality outcomes determined by aggregate market conditions that reflect the relative social value of a good or service results in both short run and long run efficiency.

76. To achieve these efficiencies in the IP CTS market, where providers are compensated by the TRS Fund at a regulated rate rather than by consumers, the FCC's rate methodology should aim to approximate market forces. A market-based rate least distorts economic incentives to innovate, least distorts allocation of total resources, least distorts firm entry, and least distorts vertical integration decisions.

77. Adopting a submitted cost-based compensation rate in order to rein in the current burden on the TRS Fund would be short-sighted. Submitted cost-based compensation creates the cost-increasing and innovation-reducing distortions, and imposes significant administrative burdens on both regulators and providers.

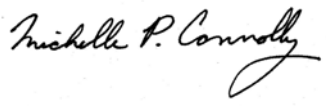
Rcd 8961 (1995) (concluding the FCC's first performance review of LEC price caps four years after they took effect).

78. A single, uniform rate for undifferentiated service best approximates an unregulated market, namely without artificially favoring a subset of providers. Adopting tiered IP CTS rates would generate additional distortions and losses relative to socially optimal outcomes, and would require regulators be in the business of picking which subset of providers to favor. Treating firms' costs non-uniformly likewise would create market distortions and suboptimal outcomes.

79. Either the use of a reverse auction or a well-designed price cap mechanism would allow the FCC to set a non-biasing single compensation rate with improved social outcomes relative to cost-based compensation.

80. To maintain incentives for innovation, minimize uncertainty, reduce the costs of transactions and directly unproductive activities, and avoid having the FCC explicitly determine a subset of firms which deserve favored treatment at the cost of other firms, it is important that the FCC choose a single rate of compensation with a clear adjustment path moving forward. The closer this single regulated compensation rate is to the price which would occur in an unregulated IP CTS market (absent market failures), the closer IP CTS market outcomes will be to the socially efficient outcomes.

81. To the best of my knowledge, and based on my research and understanding of the current state of economic knowledge as of the date of this declaration, I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.



Michelle P. Connolly

APPENDIX A

Current Distribution of Costs and Market Share

1. As mentioned in the text, there are two points to be made about the observed distribution of cost and market share in the IP CTS market. First, a wide distribution of provider costs and market share can be the result of many factors, not just economies of scale. Second, while economies of scale are present in the IP CTS market, a majority of providers are likely to already be producing at levels where they have already exhausted their scale economies.

2. First, observed variation in costs of provision and market share across providers is not necessarily only a consequence of scale of production or the length of time the provider has been in the market.[1] In reality, high costs and low market share can be driven by internal differences in management, technology, investments, etc. These differences can lead to less efficient firms having lower market share and higher costs *independently* of economies of scale.[2]

3. Graph 1 illustrates that scale need not be the only factor affecting cost. In this example, Firm 2 always has higher average costs than Firm 1, regardless of the scale of production.

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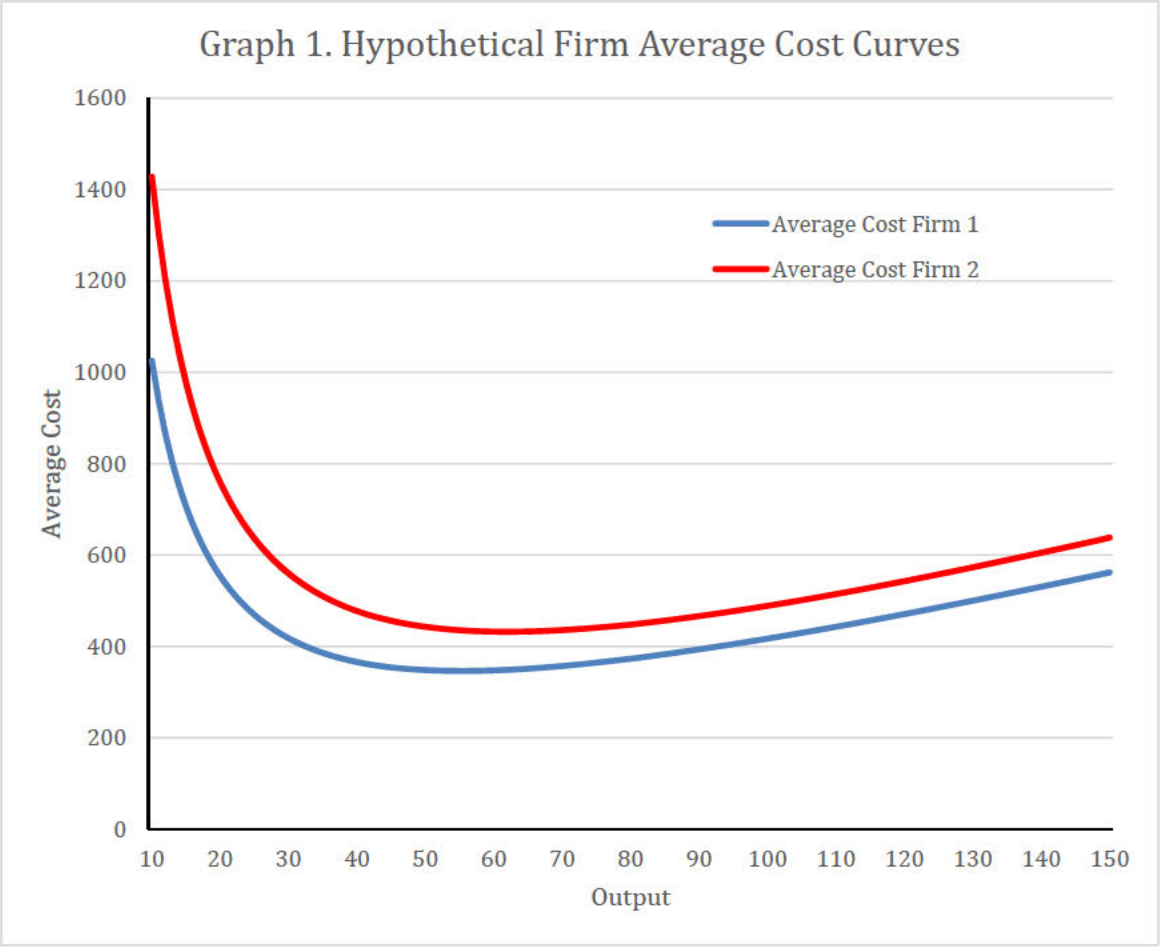
[1] This is particularly noticeable in the IP CTS market. ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGLY CONFIDENTIAL******

[2] Michael Katz (Mar. 9, 2012) "An Economic Analysis of VRS Policy Reform," p. 34. Chad Syverson (2004), "Market Structure and Productivity: A Concrete Example," *Journal of Political Economy*, 112(6): 1181-1222.



4. Some providers may have high costs because of a lack of competitive pricing pressure. Similarly, some providers may have low market share because they offer lower quality service to the final consumer who faces the same zero marginal price for service regardless of provider. Michael Katz (2012) explains:

> … the most successful firms may well have the lowest costs, but this does not imply that their costs are lower because the firms are large. Indeed, there is reason to believe that causality runs in the reverse direction: those firms that are most successful in attaining low costs can be expected to gain market share. This is true even in the absence of price competition: firms that earn higher margins through more efficient operations have a greater incentive to attract new customers by

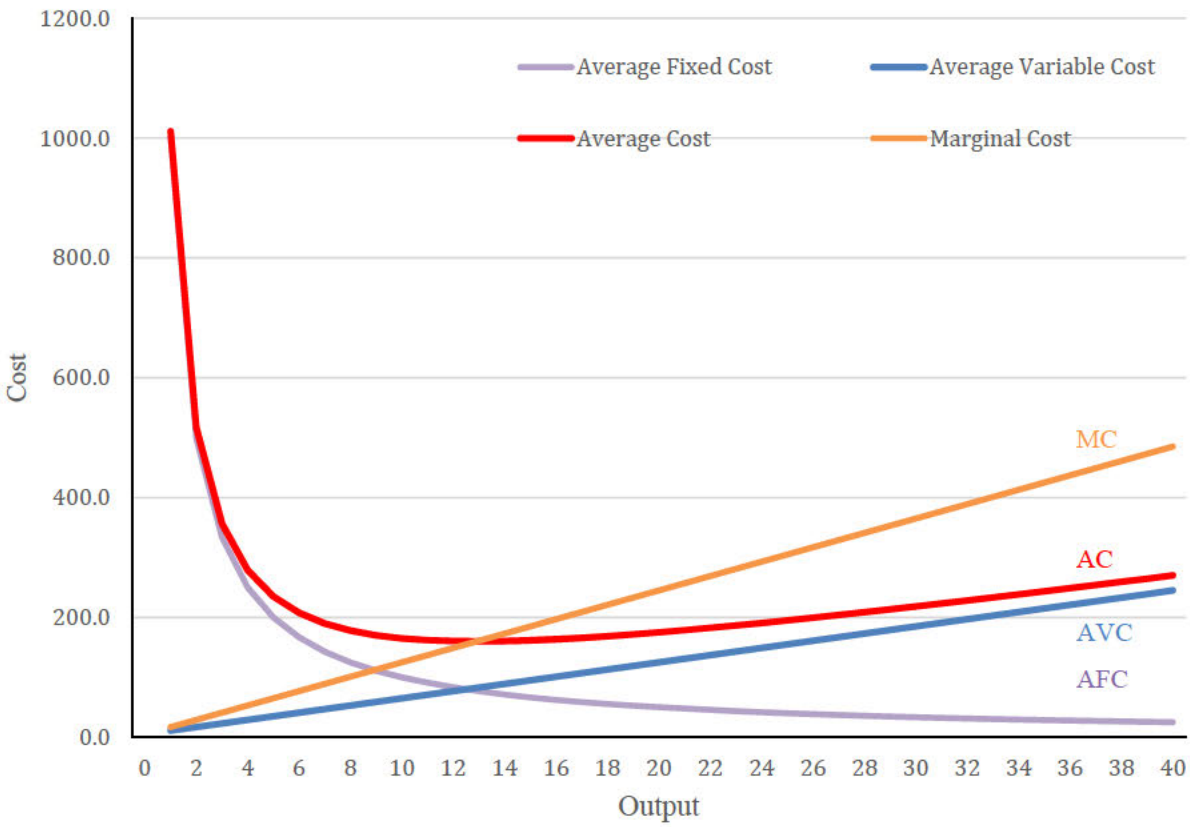
offering attractive services. This pattern of growth generates a negative correlation between firm size and average cost that is unrelated to economics of scale.[3]

5. Finally, some may assume that higher cost providers have not yet reached a volume in which their economies of scale have been exhausted. This assumption does not hold in the IP CTS market, in which the use of call centers leads to discontinuities in production costs. The use of communications assistants (CAs) for *each* IP CTS call leads to marginal costs being high, despite the presence of economies of scale over a particular range of provision.

6. Graph 2 shows cost curves reflecting economies of scale that are exhausted at fairly low levels of production.

[3] Michael Katz, *An Economic Analysis of VRS Policy Reform* 34 (Mar. 9, 2012).

Graph 2. Example of Exhaustion of Economies of Scale



7. A firm faces increasing returns to scale only while average cost decreases with output. As this illustration shows, in this range of increasing returns to scale, marginal cost is below average cost. Further, with this cost function, average variable costs rise above average fixed costs exactly as economies of scale are exhausted.[4]

8. Rolka Loube's calculation of per minute fixed versus variable costs is instructive in applying these principals in the IP CTS context. As Table 1 shows, Rolka Loube defines 68.5%

[4] In Graph 2, average cost is minimized at 13 units of output. This means that the firm exhausts its economies of scale after production of 13 units of output. A different firm—with a different cost function—would exhaust economies of scale at a different level of production.

of providers' total costs in 2017 as "variable"; and, it estimates that variable costs will be just under 70% of total costs in 2018.

Table 1. Rolka Loube (2018) Attribution of Submitted IP CTS Provider Costs

	2015	2016	2017	2018 Est
Total Cost	1.4863	1.2798	1.2435	1.3272
				0.9613
Variable Cost	0.9638	0.9147	0.9000	
Variable Cost as % of Total	64.8%	71.5%	72.4%	72.4%

Source: Rolka Loube, Exhibit 1-3.2

9. As illustrated in Graph 2, once economies of scale are exhausted in this particular cost function, average variable costs become larger than average fixed costs. In other words, they become more than 50% of average total costs.[5] Applying this observation to the IP CTS data in Table 1, suggests that economies of scale for the average IP CTS provider have likely already been exhausted at current levels of production.[6]

[5] Average total cost is the sum of average fixed costs and average variable costs. Hence, as average variable costs become more than 50% of average total costs, we know that average variable costs are greater than average fixed costs.

[6] Providers have argued that the cost data reported to Rolka Loube do not accurately report the true costs incurred by providers. Several providers argue that key costs are not "allowable" in the submitted costs. *See, e.g.*, Sprint Petition for Reconsideration, CG Docket Nos. 13-24 & 03-123, at 13 (July 27, 2018); Letter of David O'Connor and Helgi Walker, Counsel to Hamilton Relay, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket No. 13-24, at 4 (filed Nov. 14, 2017); Sorenson Communications, LLC Comments on Rolka Loube Payment Formulas and Funding Requirements, CG Docket Nos. 03-123, 10-51, at 4-5 (May 24,

10. Rolka Loube estimates in the *TRS Administrative Report* (2018) the number of minutes each provider would be likely to provide from July 2018 to June 2019 if compensated at a rate of $2.0007. For current purposes, these estimates are being used to estimate the relative volume of service and relative submitted costs for each provider. In other words, the base rate used in Rolka Loube's estimates is constant across providers. Hence, whether it is high or low relative to the FCC's determined compensation rate for 2018-2019, does not impact the information it reveals about the volume and submitted costs of providers, *relative to each other*. Table 2 shows Rolka Loube's estimated minutes, along with the market share implied by those minutes.

2017). There is also some concern as to the accuracy of these reported costs since they were submitted in a period in which they were not expected to be used to determine compensation rates (since MARS was in use at the time). Finally, some providers have argued that certain costs, such as marketing and outreach, should be considered variable costs rather than fixed costs. *See, e.g.*, Sorenson Communications, Inc. Reply Comments on VRS Compensation Rules, CG Docket Nos. 10-51 and 03-123, at 3 (Dec. 24, 2015); Comments of ZVRS to the Compensation Rate Freeze, CG Docket Nos. 10-51 and 03-123, at 15, (Dec. 9, 2015). Here I am not arguing that the Rolka Loube calculations are perfect or even appropriate for setting rates. I am simply using these to demonstrate that under any reasonable calculation, variable costs are currently a large fraction of total costs in IP CTS.

Table 2. Rolka Loube Estimated Minutes for July 2018-June 2019

(based on a MARS rate of $2.0007)

11. ******BEGIN HIGHLY CONFIDENTIAL******

[redacted]

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12. Miracom, ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** launched its IP CTS in June 2014 under the name InnoCaptions.[7] Unlike other providers, InnoCaptions only offers service on mobile devices, which likely limits its market. All other providers are estimated to provide significantly more than ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** minutes per month.[8]

[7] Hayley Tsukayama, *After Two Years, App to Assist Mobile Deaf Users Finally Gets Nod of Approval from FCC*, Wash. Post (May 14, 2014), https://www.washingtonpost.com/news/the-switch/wp/2014/05/14/after-two-years-app-to-assist-mobile-deaf-users-finally-gets-nod-of-approval-from-fcc/?utm_term=.424c31819f61.

[8] Hamilton and Sprint both resell services from CapTel but now supplement their resale service with call centers of their own. *See* Application of Hamilton Relay, Inc. for Certification as a Provider of Internet Relay Services and Internet Protocol Captioned Telephone Services, CG Docket Nos. 10-51 and 03-123, at 19 (Dec. 5, 2011) (launching IP CTS services from Hamilton call centers in April 2011); Comments of Ultratec, Inc. and CapTel, Inc. on Petition Filed by Sorenson Communications, Inc. and CaptionCall, LLC Reg[a]rding Licensing of Internet Protocol Captioned Telephone Service, CG Docket Nos. 03-123 and 13-25, at 7 (Dec. 29, 2014) (noting

Table 3. Rolka Loube Estimated Minutes and Average Cost Per Minute, July 2018 – June 2019
Based on Submitted Expenses

13. ******BEGIN HIGHLY CONFIDENTIAL******

[redacted]

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14. Table 3 shows the estimated costs per minute by provider based on submitted costs and Rolka Loube's estimates of volume for each provider.[9] The first thing to note is that ******BEGIN HIGHLY CONFIDENTIAL****** [redacted] ******END HIGHLY CONFIDENTIAL******

that Hamilton and Sprint also operate their own IP CTS call centers). According to its website, Hamilton hosts call centers in Albany, GA; Aurora, NE; Baton Rouge, LA; Columbus, GA; Frostburg, MD; Pittsfield, MA; and Wichita, KS. Hamiltontel.com/locations/ (last visited Sept. 13, 2018). Based on this, a rough estimate is that CapTel is providing wholesale service for somewhere between ******BEGIN HIGHLY CONFIDENTIAL****** [redacted] ******END HIGHLY CONFIDENTIAL****** minutes annually.

[9] Again, the Rolka Loube estimates are based on a potential MARS rate of $2.0007. The discussion here is focusing on provider efficiency in relative terms rather than absolute levels.

15. Miracom is estimated to provide ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** Clear Caption is estimated to provide ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** Hamilton and Sprint primarily resell CapTel services. Individually, they are estimated to provide ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** CaptionCall has the ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** when CaptionCall's licensing fee is included.

16. The fact that even with ******BEGIN HIGHLY CONFIDENTIAL***** [redacted] ******END HIGHLY CONFIDENTIAL***** confirms the fact that economies of scale are being exhausted at fairly low levels of production in IP CPTS.

APPENDIX B

Qualifications

1. I am a Professor of the Practice in the Economics Department at Duke University. I received a Ph.D. in economics from Yale University in 1996. After working at the Federal Reserve Bank of New York, I became an Assistant Professor of Economics at Duke University in the fall of 1997. I was promoted to Associate Professor of the Practice in 2006. While on leave from Duke University, I served as the Chief Economist of the Federal Communications Commission from 2006 to 2007. I reported directly to the Chairman of the FCC and advised the Chairman and his staff on a variety of topics. I returned to Duke University in 2007. In 2008, I was again asked to serve as Chief Economist of the FCC. After my second term at the FCC, I returned to Duke University. In 2012, I was made full Professor of the Practice at Duke.

2. I have taught courses on the Economics of Telecommunications Policy, Intermediate Macroeconomics, Graduate International Trade, and Graduate Advanced Macroeconomics, all at Duke University. I also have taught courses on research methods for undergraduate honors students. I have done economic research on topics involving theoretical and applied industrial organization. Much of my research considers industries in which there is monopolistic competition. I currently have several working papers analyzing the impact of auction rules on the economic valuation of spectrum used for cellular services. I have published articles in peer-reviewed journals including the *American Economic Review*, the *American Economic Journal: Macroeconomics*, the *Review of Industrial Organization*, the *Review of Network Economics*, the *Journal of Economic Growth*, the *Journal of Economic History* and the *Journal of Development Economics*. I have been awarded a grant from The National Science Foundation,

invited to speak at the White House, and testified before Congress. I also have been an invited presenter or panelist on a variety of issues related to telecommunications policy.

3. My curriculum vitae follows.

CURRICULUM VITAE August 2017

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Department of Economics

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EDUCATION

Ph. D., Economics, Yale University, 1996
M. Phil., Economics, Yale University, 1993
M. A., Economics, Yale University, 1992
B. A., Economics, Phi Beta Kappa, Summa Cum Laude, Distinction in the Major, Yale University, 1990

APPOINTMENTS

Professor of the Practice, Duke University, August 2012 - present
Associate Professor of the Practice, Duke University, Sept. 2006 - July 2012
Chief Economist, Federal Communications Commission, Aug. 2008 – 2009
Economics Director of Duke in New York: Financial Markets and Institutions Program, Jan. 2007 - June 2009
Director of EcoTeach, Duke University, Sept. 2007 – July 2008
Chief Economist, Federal Communications Commission, Aug. 2006 – 2007
Director of EcoTeach and Assistant Professor of the Practice, Duke University, Sept. 2005 – Dec. 2006
Assistant Professor, Duke University, Sept. 1997 – Aug. 2005
Economist, International Research Function, Federal Reserve Bank of New York, Aug. 1996 – 1997

FIELDS

Macroeconomics, Int'l Trade, Development, Growth, Telecommunications, Media

GRANTS

National Science Foundation, Secure and Trustworthy Cyberspace Medium Grant, "Dollars for Hertz: Making Trustworthy Spectrum Sharing Technically and Economically Viable," 2013-2017
Teagle Grant, Duke University, 2008
Spencer Grant, Duke University, 2006
Arts and Sciences Research Council Grant, Duke University, 1998
Arts and Sciences Research Council Grant, Duke University, 1997
John F. Enders Research Grant, 1995

HONORS AND AWARDS

Howard D. Johnson Trinity College Teaching Prize, 2011
Top 5% of Duke University Undergraduate Instructors: Fall 2009, Fall 2010, Fall 2011, Spring 2017
Honorary Faculty Speaker, Duke University Economics Majors Graduation, Spring 2010

Raymond Powell Teaching Prize, Yale University, 1994
Yale University Dissertation Fellowship, 1995
Ryoichi Sasakawa Young Leaders Fellowship, 1993
Yale University Fellowship, Full Support, 1990-1994

William Massee Prize for Excellence in Economics, (Best Academic Grade Record in Economics), Yale University, 1990
Phi Beta Kappa, Yale University, 1990
Summa Cum Laude, Yale University, 1990
National Merit Scholar, 1987

PUBLICATIONS

Connolly, Michelle, Clement Lee and Renhao Tan, "The Digital Divide and other Economic Considerations for Network Neutrality," *Review of Industrial Organization.* December 2016: 1-18. DOI 10.1007/s11151-016-9554-8.

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WORKING PAPERS

Connolly, Michelle, Nelson Sá, Azeem Zaman, Chris Roark, and Akshaya Trivedi, "The Evolution of U.S. Spectrum Values Over Time," Economic Research Initiatives at Duke Working Paper No. 247, 2017.

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Connolly, Michelle, Repton Salisbury, Akshaya Trivedi and Azeem Zaman, "FCC Spectrum Auction Rules," 2017.

Connolly, Michelle, Ricardo Martinez-Cid, Wenfei Jiao, "A Brief Review and Analysis of Spectrum Auctions in Canada," 2017.

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OTHER WORK

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Book Review on *The Race between Education and Technology* by Claudia Goldin and Lawrence Katz. *Economic History Review*, Vol. 63.3, Aug 2010.

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"The Impact of Removing Licenses and Restrictions to Import Technology on Technological Change." Background Report for the World Development Report 2000/2001, July 1999.

TEACHING

Economics of Telecommunications Policy, Duke University, 2012
Honors Research Seminar, Duke University, 2007 – 2017
Intermediate Undergraduate Macroeconomics, Duke University, 1998 - 2000, 2002, 2003, 2005, 2006, 2010, 2012, 2014, 2016
Graduate International Trade, Duke University, 2002, 2003, 2005
Advanced Graduate Macroeconomics, Duke University, 1997 - 1999

UNIVERSITY SERVICE

Created and Head the Spectrum Lab in Economics, Duke University, seven undergraduate and two master's lab members currently, January 2016 – present
Duke Conversations Dinner Host, April 4, 2017
Interviewer for Duke Nominations for Rhodes, Marshall, Mitchell, and Schwarzman Scholarships, Fall 2016
Committee on Diversity in the Economics Major, 2016 - present
Vice-President, Phi Beta Kappa, Duke University Chapter, 2014 – present
Director of Honors Program, Department of Economics, 2007– 2008, 2009 – present
Committee on Members in Course, Phi Beta Kappa, Duke University Chapter, 2009 – present
Duke Alumni Association Board Member, Sept. 2012 – May 2016
Faculty Advisor to Duke Fed Challenge Team, 2015
Duke Library Council, 2012 – 2015
Duke Faculty-Student Connections Work Group, 2012
Duke Arts and Sciences Research Council Grants Award Committee, 2011 – 2013
Director of Duke in NY: Financial Markets and Institutions Program, 2007 – 2009
Co-creator of Duke in NY: Financial Markets and Institutions Program, 2007
Director of EcoTeach, Department of Economics, 2005 – 2008
Duke University Academic Council, 2007 – 2008 and 2009 – 2010
Committee on the Undergraduate Experience, Duke University, Fall 2005
Forum for Excellence in Undergraduate Education, Fall 2005 – Fall 2009

PRESENTATIONS IN LAST TEN YEARS

Panelist for "The Free State Foundation's Ninth Annual Telecom Policy Conference," National Press Club, Washington, DC, May 31, 2017

Panelist for "The Future of the Internet in a Post-Internet Regulation World," Technology Policy Institute, National Union Building, Washington, DC, May 23, 2017

Panelist for "The Impact of Broadband Competition on Consumer Welfare, Innovation, and Productivity in the United States: A Policy Forum," Georgetown on the Hill, Rayburn House Office Building, Washington, DC, May 9, 2017

Panelist for "The Role of Economic Liberty in the United States," The Federalist Society, National Press Club, Washington, DC, March 28, 2017

Participant at White House Roundtable Discussion of the Trans Pacific Partnership, Roosevelt Room, Washington, DC, Oct. 25, 2016

Discussant for "The Future of the Internet Ecosystem in a Post-Open Internet Order World" Technology Policy Institute and the University of Pennsylvania Law School's Center for Technology, Innovation and Competition, National Press Club, Washington, DC, January 8, 2016

Panelist for "Does Platform Competition Render Common Carriage Irrelevant in an IP World?" Progressive Policy Institute, Washington, DC, November 20, 2013

Panelist for "A Workshop on How to Meet the Information Needs of Communities." UNC Center for Media Law and Policy, Jan. 20, 2012

Chautauqua Lecture for Duke University Freshman, 2011 and 2012

Panelist for Congressional Hispanic Caucus Institute Public Policy Conference, Sept. 2011

Witness for the Congressional Hearing on "Promoting Broadband, Jobs and Economic Growth Through Commercial Spectrum Auctions." For the Communications and Technology Subcommittee of the House Energy and Commerce Committee. June 1, 2011

Panelist with Paul Milgrom, Michael Riordan, and Hal Varian for the Presentation of the FCC Spectrum Auction Authority Letter to President Obama. White House. April 6, 2011

Panelist at the Broadband Breakfast, "Setting the Table for the National Broadband Plan: Collecting and Using Broadband Data," Washington, DC, February 2010

AAC&U Annual Meeting, "Systematic Improvement of Teaching and Learning Through Experimentation and Assessment," Washington, DC January 2010

NBER's Summer Institute 2009, Economic Fluctuations and Growth, Small Working Group, Cambridge, July 2009

Systematic Improvement of Undergraduate Education in Research Universities, Duke University, June 12, 2009

Panelist and Moderator, ACLP Advanced Communications 2009 Summit, Advanced Communications Law and Policy Institute, New York Law School, April 2009

Keynote Panelist, Wireless Technologies: Enabling Innovation and Economic Growth Conference, Georgetown Center for Business and Public Policy, Washington, DC, April 2009

Martin H. Crego Lecture in Economics, All College Lecture, "Economics and Public Policy at the FCC," Vassar College, March 2009

Forum for Excellence in Undergraduate Education, Kennedy School, March 2009, Nov. 2007, Nov. 2006, and Nov. 2005

"Universal Service Fund Reform," Phoenix Center 2008 Annual U.S. Telecoms Symposium: Telecoms Priorities for the New Administration, Washington, DC, Nov. 2008

"Intellectual Property Rights and International Trade," Conference on Regional Determinants of Productivity Growth, University of Washington, Oct. 2007

"Economic Drivers in Policy Formulation," Spectrum Management Conference, Law Seminars International, Washington, DC, Sept. 2007

Keynote Speaker, "Antitrust Developments in the United States," CRA Int'l Antitrust Conference, Brussels, June 2007

Keynote Speaker, "Economic Analysis in FCC Decision Making," FCBA and Stanford Institute on Economic Policy Research, April 2007

PROFESSIONAL ACTIVITIES

Yale Alumni School Committee Volunteer, October 2012 – present
Board of Academic Advisors, Free State Foundation, July 2011 – present
Steering Committee Member for NSF funded "Enhancing Access to the Radio Spectrum (EARS) Initiative, Spring 2010
Consultant to the National Broadband Task Force, 2009 – 2010
2009 TPRC Program Committee Member: The 37th Research Conference on Communication, Information and Internet Policy, September 2009
Consultant to the Federal Communications Commission, 2007
2008 TPRC Program Committee Member: The 36th Research Conference on Communication, Information and Internet Policy, September 2008

LANGUAGES

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APPENDIX D

REVERSE AUCTION PROPOSAL FOR SETTING IP CTS RATES

Professor Andrzej Skrzypacz
Prepared for CaptionCall, LLC
September 17, 2018

I. Executive Summary

- This proposal describes a reverse auction design that the Federal Communications Commission ("FCC") could use to set an IP CTS rate competitively.
- This design provides incentives for IP CTS providers participating in the auction ("participants") to submit low bids. It does so by rewarding winning bidders (low bidders) with preferential access to new customers, and by threatening losing bidders (higher bidders) with no – or lower – compensation from the TRS Fund for minutes used by new customers until the next auction cycle.
- The auction proposed is a multi-round descending clock auction with a uniform rate offered to all winning bidders. At least two winners are guaranteed per auction cycle, and more are possible.
- The proposal envisions that the auction will be conducted annually. Although the Commission could opt for a different interval, an interval of less than one year is not recommended.
- The auction starts with a specified rate (the reserve price). As long as two or more bidders place bids at that price, the rate decreases. Participants are not allowed to see which bidders or how many bidders remain. When only one bidder remains, the auction stops. The winning rate is the last price at which at least two bidders were still active.
- All bidders who were still active at prices within x% (*e.g.*, 5%) of the winning rate become winning bidders. Bidders who dropped out at higher prices become losing bidders. In addition, new entrants and small providers that do not participate in the auction may be treated as winning bidders so long as they satisfy applicable quality standards.

- To protect existing customers, all providers (including winning and losing bidders) may continue offering service to their current IP CTS customers at the winning rate. Losing bidders may not add new customers (or at least may not request TRS Fund reimbursement for any new users they add) during the auction cycle. I also discuss alternative, more lenient treatments of losing bidders and the tradeoffs involved.
- The proposed design facilitates new entrants, including those trying new technologies, by allowing them to start offering service at the winning rate at any time in between auctions (subject to certain eligibility criteria).
- I discuss necessary safeguards that the FCC must include in the auction design to assure the stability of the market and the Fund. Among other things, I propose that the new rate should be phased in gradually over time, in four equal quarterly increments. A phase-in approach will provide some measure of stability for both providers and the Fund, and will reduce the risk of losing bidders exiting the market.

II. Introduction and Objectives

CaptionCall, LLC asked me to design a reverse auction that could be used to set IP CTS rates. In designing this proposal, I have followed the following objectives and principles:

- **Economic Incentives for Bidding:** The auction must create economic incentives by rewarding low bidders relative to high bidders.
- **Preserve Quality of Service:** The process must ensure high quality of service. This objective can be accomplished by imposing eligibility criteria so that only service providers that provide quality service would be qualified to participate in the auction.
- **Preserve Consumer Choice and Minimize Transaction Costs for Existing Customers:** To the greatest extent possible, the process should preserve consumer choice, and existing customers should be able to continue using their existing equipment and provider if they so choose. The proposal accomplishes this goal in two ways. First, all providers may continue to serve

their current customers as long as they are willing to be compensated at the competitively-set rate. Second, the design guarantees that at least two current providers (and potentially more) will win the right to add new customers.

- **Stability of Business:** To the greatest extent possible, the auction should promote stability of business plans for existing providers. In particular, IP CTS rates should not fluctuate too quickly (*i.e.*, the rates for existing users should not change drastically in a short time horizon).
- **Stability of the TRS Fund:** Although the auction should allow rates to increase if costs go up, to protect the stability of the Fund, the FCC should be able to put a cap on the reserve price that guarantees that any rate increases are limited.
- **The Possibility of Entry:** The auction-supported IP CTS rate-setting process should not foreclose new providers from entering the market. In particular, new entrants should be permitted to begin offering service between auctions at the current auction rate, so that they have the option to begin seeking reimbursement at the market price without participating in the auction. These protections should apply to new entrants, so long as they can meet minimum quality standards.
- **Administrative Costs:** The design should seek to minimize organizational and administrative burdens for both the FCC and IP CTS service providers.
- **Uniform Price:** To the extent possible, providers offering the same service should be reimbursed at the same rate.

No auction design can perfectly satisfy all of these principles at the same time. For example, the provision of economic incentives to bid aggressively is intrinsically inconsistent with providing full business security to existing providers. The auction design I propose tries to strike a balance among these different objectives, but several parameters could be modified depending on the FCC's objectives and any industry changes that mights occur between now and the auction. For example, it may be appropriate to adjust some of these parameters to reflect the most current information.

III. Auction Design Proposal: Reverse Auction for the Rights to Add New Users

Because IP CTS continues to attract many new users, an auction design that offers low bidders preferential access to new users would create a substantial economic incentive to bid aggressively. Here, preferential access would mean that winning bidders would be allowed to add new customers and receive compensation from the TRS Fund for these customers' IP CTS minutes, while the losing bidders would not. Losing bidders could remain in the IP CTS market by continuing to providing service to their existing customers at the auction-determined rate and attempting to win in the next auction cycle.[1]

The proposed auction process and preferential access afforded to winning bidders are described in further detail below.

A. Auction Mechanics: Auction Process, Rate and Winner Determination, and Eligibility Criteria

- **Auction Process:** Auction-eligible service providers may participate in a descending clock (reverse) auction that sets the per-minute reimbursement rate for IP CTS until the next auction cycle.[2]

    - The auction starts at the reserve price set by the FCC (discussed below) and progresses in a series of rounds.
    - At the beginning of each round, the FCC declares a new opening-round rate and asks all still-active bidders if they are willing to provide service at that rate. Those who bid 'yes' remain active and may participate in the next round. Those who bid 'no' become inactive and drop out of the auction.
    - If there are two or more active bidders, the FCC reduces the opening-round rate by a small bid increment (for example, 2 cents or 1%, whichever is lower) and the auction continues to the next round.

[1] I discuss other alternative forms of preferential access below.

[2] See below for a discussion of potential alternative treatment of small providers or new entrants.

- When fewer than two active bidders remain at the end of a round, the auction ends. The winning rate is the previous-round rate. (If the auction ends in the first round, the winning rate is the reserve price.)
- Between rounds, the auction reporting system informs bidders only about the current bid rate and whether or not the auction is still active. Information about the number of other bidders still active or the identity of those bidders would not be available.

- **Rate and Winner Determination:**

  - As stated above, the **winning rate** will be equal to the rate in the round prior to the round in which the auction closes.
    - For example, in round *k,* the rate is $1.75, so in round *k*+1, the rate becomes $1.73. There are two active bidders at the end of round *k,* but one of them becomes inactive in round *k*+1. Then the winning rate is $1.75.
  - All bidders active in the round prior to the closing round are automatically winning bidders (by definition, there will be at least two).
  - Any other bidders who were still active at the end of any round when the rate was within x% (*e.g.*, 3-8%) of the winning rate also become winning bidders.
    - Continuing the above example, with the $1.75 winning rate, if x% is chosen to be 5%, then any bidder active at the end of the round with rate $1.84 or less (≈$1.75*1.05) is also a winning bidder. These winning providers, like the other winning bidders, may add new subscribers and be compensated at the winning rate of $1.75.
  - Bidders who became inactive at the end of a round in which the rate was more than x% different from the winning rate are losing bidders.

- **Eligibility Criteria:** Only service providers that have established their ability to offer quality service to a substantial fraction of the market are eligible to bid in the auction. (As explained below, small providers and new entrants

may be allowed to offer service at the winning rate without participating in the auction.)

B. Preferential Access for Winning Bidders (Allowable Reimbursements and Rates for Winning and Losing Bidders)

For the duration of the period for which the auction sets rates, the winning bidders can grow their business without any constraints (other than standard regulatory requirements – for example, with respect to eligibility). They can offer service to new users and be reimbursed by the FCC at the winning rate.

Losing bidders are not allowed to add new customers; or, if they do add new customers, losing bidders may not receive reimbursement from the FCC for the IP CTS minutes provided to those new customers for the duration of the period for which the auction sets rates.[3]

All providers (auction winners and losers) can continue serving customers who were using their services before the auction at the **winning rate.** (I discuss below a gliding rate approach so that the rate adjusts gradually over time at a rate no higher than 2.5% a quarter.)

Alternative conditions for **smaller providers and new entrants** are discussed below.

C. Further Considerations in Designing the Auction

1. Reserve Prices

To assure that the auction does not result in unexpected cost increases for the TRS Fund, the FCC may impose a reserve price (rate) that is the highest rate it is willing to pay. The descending-price auction would start at that price.

Note that competition among service providers can drive rates temporarily and inefficiently below costs, so that the reserve price should not automatically be set below the prior year's rate. This can happen, for example, if a service provider miscalculates its

[3] See discussion below for a possible relaxation of that constraint.

efficiencies of scale and how much it will be able to grow its market share if it wins the auction. If the reserve price is kept inefficiently low, it can result in providers leaving the market, which in turn would create service interruptions. It is therefore important that the process can self-correct in the next auction cycle.

The auction is designed so that competition among bidders results in fair rates reflecting true costs. The reserve prices should be used solely as a safety mechanism, not to artificially constrain the outcome of the auction.

2. Assuring the Stability of Rates – Phasing-in New Rates

In order to provide stability for both the TRS Fund and for service providers, I propose that the new rate should be phased in gradually over time, in four equal quarterly increments.

> For example, if the winning rate decreases by 12 cents/minute, a gradual phase-in would be that it would decrease by 3 cents/minute at the beginning of each quarter over four quarters. Similarly, if the rate increases, the increase would be phased-in over four quarters. For example, if the winning rate increases by 8 cents/minute, the rate at which the FCC reimburses providers would be increased by 2 cents/minute at the beginning of each quarter over four quarters.

Such a gradual adjustment approach would provide some insurance to existing providers and to the Fund. It would reduce the risk of losing bidders being driven out of business as the result of one auction with extreme results. They would have some time buffer to reduce costs to remain competitive.[4]

3. Safeguards

Relying on a reverse auction to set rates introduces some degree of uncertainty into the rate-setting process. First, rates may change year-to-year in response to changes in cost

[4] If the winning rate differs from the previous-auction winning rate by more than 10%, the phase-in period would be extended and any single quarter adjustment would be capped at 2.5%. To reduce the administrative burden of reporting which customers are reimbursed at which rate, the rate for new customers and for existing customers should be phased in using the same approach.

structures. Second, losing bidders may find themselves shut out of the market for new subscribers. Third, the costs to the TRS Fund may fluctuate unexpectedly.

To balance these issues, I recommend implementing the following safeguards:

- Rates should not change in either direction by more than 2.5% a quarter.
- Auctions should take place once a year, or less frequently (for example, every 18 or 24 months). These intervals will allow losing bidders time to reduce their costs and submit more competitive bids in the next auction. (Auctions should not be held more frequently than annually because incentives to bid aggressively decline when auction cycles are more closely spaced; uncertainty of outcomes could be even more significant; and the administrative and practical burdens on both the Commission and bidders would increase).
- Bidders must be pre-qualified to participate in the auction, by showing credible capability and capacity of providing quality service. They should be providing service at some minimum scale, *e.g.*, 2% of the market. They should also demonstrably satisfy a minimum quality standard. Finally, to avoid costly mistakes and disruption of service, in case a provider has less than 5% of the existing subscribers, it should be asked to demonstrate that their bids are not below their costs.[5]
- The FCC should retain the right to cancel the auction if the winning bids and the winning rate would jeopardize the continued provision of the service (for

[5] While unrealistically-low rates may, at first, seem beneficial to the Fund, they may not result in any long term benefits to the FCC or to IP CTS users. *See, e.g.*, Letter from Scott R. Freiermuth, Counsel for Sprint Corp., to Marlene H. Dortch, Secretary, Federal Communications Commission, CG Docket Nos. 13-24, 13-123 (June 1, 2018) (discussing collapse of IP Relay market due to providers' exiting market after rate decrease); *see generally In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Order, 28 FCC Rcd 9219, 9221-245 ¶¶ 10-20 (CGB 2013); *In re Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities*, Order, 29 FCC Rcd 16,273 (CGB 2014). New service providers that bid unrealistically low could later decide not to offer any service. That may result in service interruptions, lack of new service options, or both. A particularly dangerous scenario would be if two new entrants were to submit unrealistically low bids with no intention to offer service, but instead intending to disrupt the market. For example, new entrants may hope to unfairly reduce competition by offering vastly inferior competing service and disrupting the IP CTS market.

example if the winning rate is unsustainably low) or the sustainability of the Fund (or for any other unforeseen reason).

4. Necessary Data Collection

The reverse auction would require all providers to submit a list of subscriber phone numbers on an annual basis (or each auction cycle). For privacy reasons, these lists could be submitted without disclosing actual names or addresses. All providers would be required to submit this data before the auction to enable the FCC to determine the set of reimbursable minutes for the losing bidders.

5. Information Reporting during the Auction

The auction system would keep confidential the number of active bidders that remain in each round. Were information about other auction participants available, it would create a high risk that the second-lowest bidder would strategically drop out as soon as it learns that only two bidders remain. That, in turn, would provide little incentive for the third-lowest bidder to bid aggressively (because that bidder would reasonably expect that the auction will stop as soon as it becomes inactive). Not knowing how many other bidders are still active and how low the rate may go, a bidder will face a severe risk of being shut out from the market for new customers if it drops out too soon, at a bid price significantly above its per-minute costs.

After the auction ends the winning rate and the set of winning bidders would become public. All other bid data should remain private (not to affect bidding in the next auction).

6. Alternative Treatment of Losing Bidders

The auction I describe above is based on offering the winning bidders significant preferential access to new users: Losing bidders are not allowed to add any new subscribers (or, more precisely, to be reimbursed for any minutes provided to new subscribers) during the auction cycle.

While the risk of being shut out should create powerful incentives for aggressive bidding, it could also produce high costs for losing bidders if it required them to shut down their marketing and outreach until the next auction cycle.

An alternative solution would be to allow the losing bidders to continue adding new users but only at a lower rate than the winning bidders (for example, the FCC could compensate losing bidders at 80% of the winning rate). Although that reduced rate may be below losing providers' average costs, it may nonetheless be higher than the marginal cost if one takes into account the costs of closing the outreach organization for a year and later having to re-build it.

A provision of that kind would provide an additional safeguard for the IP CTS providers. Even if they are not winning bidders in the auction, the lower rate would apply only to new customers; and existing customers would still be reimbursed at the winning rate. As an additional safeguard, the FCC could consider imposing the lower rate for only one year from the time the new customer starts using the service (even if the auction cycle is longer than a year).[6]

The tradeoff in choosing the level of preferential access for the winning bidders (and hence treating the losing bidders more or less leniently) is that more lenient treatment of losing bidders results in weaker incentives for participants to bid aggressively in the auction. On the other hand, a strict rule against losing bidders adding new subscribers may create an unnecessary administrative burden on both service providers and the FCC and lead to inefficient management of providers' outreach and marketing operations.

7. Small Providers and New Entrants

Small providers (for example, those with less than 2% of prior-year minutes) and new entrants may lack the capacity to serve a large enough fraction of the flow of new

[6] A different solution would be to allow losing bidders to add some new customers at the winning rate, but with a binding constraint on the number related to the past-year number of added subscribers and the expected overall growth of subscribers. That solution would have similar tradeoffs as the lower-than-market rate solution.

customers to participate in the auction. These providers may also lack the expertise to participate in the auction or may find such participation too costly.

In order to protect the opportunities for market entry, the FCC may offer such new entrants and small providers the option of being treated as a winning bidder without participating in the auction. This accomodation would promote new entry and experimentation in the provision of new services. This option may be attractive to providers that find it hard to estimate the costs of providing the service at scale and may prefer to offer service at the "market rate." Moreover, such a provision would also allow new entry between auctions (*i.e.*, even if the auctions set prices July-June, this would allow new entrants to enter in January, for example). Finally, the FCC may choose to offer this provision to small providers only for a limited time.

To the extent that the FCC wants to further accommodate new entrants and small providers, it could extend this option further. For instance, the option of being treated as a winning bidder without participating in the auction could be available to new entrants for a set amount of time (for example, for two years per provider, even if the provider grows above the 2% threshold in that time).

The FCC must maintain safeguards to encourage responsible entry of providers that can deliver service above the minimum acceptable quality. In particular, the pre-qualification criteria for existing service providers seeking compensation from the Fund should apply equally to providers that opt to be treated as winning bidders without participating in the auction.

8. Frequency of Auctions

The above proposal assumes that the FCC will conduct auctions annually to determine rates and identify winning and losing bidders (as well as the preferential access winning bidders receive) for the next twelve months. In the alternative, the FCC could hold auctions less frequently (for example, at 18- or 24-month intervals). On the one hand, more frequent auctions would allow losing bidders to adjust their business and "get back in the game" sooner. On the other hand, less frequent auctions would reduce the administrative burden for the bidders and the FCC, and afford losing bidders time to

make meaningful changes. Again, an auction period of less than one year is not recommended. In addition to increasing administrative burdens, more frequent auctions could negatively impact the stability of providers' business and the predictability of Fund compensation.

IV. Conclusions

A reverse auction provides a workable method to determine the market-based IP CTS rates. Because IP CTS is currently being delivered by multiple providers, a well-structured auction can provide incentives for aggressive bidding and at the same time maintain sufficient continuity of business and consumer choice. An auction of this kind would offer stronger incentives for process and product innovation than would methods based on submitted costs. And, in the long run, an auction-based process is likely to result in better service at lower cost to the Fund and the public than would a methodology based on submitted costs.

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Education

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Co-Editor of the American Economic Review 2011-2014

Associate Editor for the American Economic Review: Insights 2017 -

Associate Editor for the RAND Journal of Economics. 2008-

Associate Editor for Theoretical Economics. 2009-2011

Associate Editor for the American Economic Review. 2006 -2011

Research

Published and Accepted Papers

1. Ivan Marinovic, Andrzej Skrzypacz and Felipe Varas (2017) "Dynamic Certification and Reputation for Quality." Forthcoming in *American Economic Journal: Microeconomics*.

2. Jonathan Levin and Andrzej Skrzypacz (2016) "Properties of the Combinatorial Clock Auction." *American Economic Review* 106(9) 2528-2551.
   Reprinted in Bichler, Martin, and Jacob K. Goeree, eds. *Handbook of Spectrum Auction Design*. Cambridge University Press, 2017.

3. William Fuchs, Aniko Öry and Andrzej Skrzypacz (2016) "Transparency and Distressed Sales under Asymmetric Information." *Theoretical Economics* 11(3) 1103–1144.

4. Johannes Hörner and Andrzej Skrzypacz (2016) "Selling Information." *Journal of Political Economy* 124(6) 1515-1562.

5. Simon Board and Andrzej Skrzypacz (2016) "Revenue Management with Forward-Looking Buyers." *Journal of Political Economy* 124(4) 1046-1087.

6. William Fuchs, and Andrzej Skrzypacz (2015) "Government Interventions in a Dynamic Market with Adverse Selection." *Journal of Economic Theory* 158, pp. 371-406.

7. Andrzej Skrzypacz and Juuso Toikka (2015) "Mechanisms for Repeated Trade." *American Economic Journal: Microeconomics*, 7(4), pp. 252-93.

8. Christopher Phelan and Andrzej Skrzypacz (2015) "Recall and Private Monitoring." *Games and Economic Behavior* 90 (March), pp. 162–17.

9. Maria Bigoni, Marco Casari and Giancarlo Spagnolo and Andrzej Skrzypacz (2015) "Time Horizon and Cooperation in Continuous Time." *Econometrica*, 83(2), pp. 587-616.

10. Matthew Mitchell and Andrzej Skrzypacz (2015) "A Theory of Market Pioneers, Dynamic Capabilities and Industry Evolution." *Management Science* 61(7), pp.1598-1614.

11. Ilan Guttman, Ilan Kremer and Andrzej Skrzypacz (2014) "Not Only What but also When - A Theory of Dynamic Voluntary Disclosure." *American Economic Review* 104(8), pp. 2400-2420.

12. Qingmin Liu and Andrzej Skrzypacz (2014) "Limited Records and Reputation Bubbles." *Journal of Economic Theory* 151, pp. 2-29.

13. T. Renee Bowen, David M. Kreps and Andrzej Skrzypacz (2013) “Rules With Discretion and Local Information.” *Quarterly Journal of Economics* 128(3), pp. 1273-1320.

14. William Fuchs and Andrzej Skrzypacz (2013). “Bargaining with Deadlines and Private Information." *AEJ: Microeconomics*, 5(4), pp. 219-43.

15. Andrzej Skrzypacz (2013) “Auctions with Contingent Payments – an Overview.” *International Journal of Industrial Organization* 31(5), pp. 666-675 (Special Issue: Selected Papers, European Association for Research in Industrial Economics 39th Annual Conference, Rome, Italy, September 2-4, 2012)

16. William Fuchs and Andrzej Skrzypacz (2013) “Bridging the Gap: Bargaining with Interdependent Values” *Journal of Economic Theory,* 148(3), pp.1226–1236.

17. Patrick Jordan, Uri Nadav, Kunal Punera, Andrzej Skrzypacz and George Varghese (2012) “Lattice Games and the Economics of Aggregators.” Proceedings of the 21st International World Wide Web (WWW 2012).

18. Christopher Phelan and Andrzej Skrzypacz (2012) “Beliefs and Private Monitoring.” *Review of Economic Studies,* 79(4), pp. 1637-1660.

19. Peter Cramton, Evan Kwerel, Gregory Rosston and Andrzej Skrzypacz (2011) "Using Spectrum Auctions to Enhance Competition in Wireless Services." *Journal of Law and Economics* 54(4), pp.167-188.

20. Joseph E. Harrington, Jr. and Andrzej Skrzypacz (2011) “Private Monitoring and Communication in Cartels: Explaining Recent Collusive Practices.” *American Economic Review* 101(6), pp. 2425–49.

21. Yuliy Sannikov and Andrzej Skrzypacz (2010) "The role of Information in Repeated Games with Frequent Actions.” *Econometrica,* 78 (3), pp. 847–882.

22. William Fuchs and Andrzej Skrzypacz (2010) “Bargaining with Arrival of New Traders.” *American Economic Review* 100(3), pp. 802–36.

23. Yuliy Sannikov and Andrzej Skrzypacz (2007) “Impossibility of Collusion under Imperfect Monitoring with Flexible Production.” *American Economic Review*, 97(5) pp. 1794–1823.

24. Joseph E. Harrington, Jr. and Andrzej Skrzypacz (2007) “Collusion under Monitoring of Sales.” *Rand Journal of Economics*, 38 (2) pp. 314 - 331.

25. Ilan Kremer and Andrzej Skrzypacz (2007) "Dynamic Signaling and Market Breakdown." *Journal of Economic Theory*, 133 (1) pp. 58-82.

26. Matthew Mitchell and Andrzej Skrzypacz (2006) "Network Externalities and Long-Run Market Shares." *Economic Theory* 29 (3) pp. 621-648.

27. Yossi Feinberg and Andrzej Skrzypacz (2005) "Uncertainty about Uncertainty and Delay in Bargaining." *Econometrica* 73 (1) pp. 69-91.

28. Peter DeMarzo, Ilan Kremer and Andrzej Skrzypacz (2005) "Bidding with Securities: Auctions and Security Design." *American Economic Review* 95 (4), pp. 936-959.

29. Jerzy Konieczny and Andrzej Skrzypacz (2005) "Inflation and Price Setting in a Natural Experiment." *Journal of Monetary Economics* 52(3), pp. 621-632.

30. Andrzej Skrzypacz and Hugo Hopenhayn (2004) "Tacit Collusion in Repeated Auctions." *Journal of Economic Theory* 114 (1), pp. 153-169. (One of the 20 Most Cited articles 2004-2008 published in JET).

Working Papers and Work in Progress

31. Yuliy Sannikov and Andrzej Skrzypacz (2017) "Dynamic Trading: Price Inertia and Front-Running." Stanford GSB working paper No. 3487. (R&R in American Economic Review)

32. Felipe Varas, Ivan Marinovic and Andrzej Skrzypacz and (2017) "Random Inspections and Annual Reviews: Optimal Dynamic Monitoring."

33. Dmitry Orlov, Andrzej Skrzypacz and Pavel Zryumov (2018) "Persuading the Regulator To Wait." Stanford GSB Working Paper No. 3406. (R&R in Journal of Political Economy)

34. Peter DeMarzo, Ilan Kremer and Andrzej Skrzypacz (2017) "Test Design and Minimum Standards." (R&R in American Economic Review)

35. Dmitry Orlov, Pavel Zryumov and Andrzej Skrzypacz (2017) "Design of Macro-Prudential Stress Tests."

36. William Fuchs and Andrzej Skrzypacz (2017) "Timing Design in the Market for Lemons." (R&R in Review of Economic Dynamics)

Chapters in Books

37. April Franco, Matthew Mitchell, and Andrzej Skrzypacz (2017) "An Economic Theory of Dynamic Capabilities." In "Oxford Handbook on Dynamic Capabilities" Editors: Sunyoung Lee and David J. Teece.

38. Johannes Hörner and Andrzej Skrzypacz (2017) "Learning, Experimentation, and Information Design." In B. Honoré, A. Pakes, M. Piazzesi, & L. Samuelson (Eds.), Advances in Economics and Econometrics: Eleventh World Congress (Econometric Society Monographs, pp. 63-98). Cambridge: Cambridge University Press.

Earlier working papers:

39. Ilan Kremer and Andrzej Skrzypacz (2006) "Information Aggregation and the Information Content of Order Statistics."
40. Jerzy Konieczny and Andrzej Skrzypacz (2006) "Search, Costly Price Adjustment and the Frequency of Price Changes – Theory and Evidence."
41. Matthew Mitchell and Andrzej Skrzypacz (2006) "Market Structure and the Direction of Technological Change."
42. Ilan Kremer and Andrzej Skrzypacz (2004). "Auction Selection by an Informed Seller."
43. Andrzej Skrzypacz (2004) "Bargaining under Asymmetric Information and the Hold-up Problem."

Main Non-Refereed Articles, Policy Briefs and Opinion Pieces

44. Gregory Rosston and Andrzej Skrzypacz "- Using Auctions and Flexible-Use Licenses to Maximize the Social Benefits from Spectrum." Submitted to the FCC in September 2017 and prepared on behalf of T-Mobile.
45. Susan Athey and Andrzej Skrzypacz (2017). "Yuliy Sannikov: Winner of the 2016 Clark Medal." Journal of Economic Perspectives, 31(2): 237-56.
46. Gregory Rosston and Andrzej Skrzypacz "Moving from Broadcast Television to Mobile Broadband: The FCC's 2016 Incentive Auction," SIEPR Policy Brief, January 2016.
47. Gregory Rosston, and Andrzej Skrzypacz " A Dynamic Market Rule for the Broadcast Incentive Auction: Ensuring Spectrum Limits Do Not Reduce Spectrum Clearance." Submitted to the FCC and prepared for T-Mobile.
48. Paul Milgrom, Gregory Rosston, and Andrzej Skrzypacz "Using Procurement Auctions to Allocate Broadband Stimulus Grants." SIEPR Policy Brief, May 2009.
49. "Comments of 71 Concerned Economists: Using Procurement Auctions to Allocate Broadband Stimulus Grants," organized by Paul Milgrom, Gregory Rosston, Andrzej Skrzypacz, and Scott Wallsten, submitted to NTIA April 13 2009.
50. Andrzej Skrzypacz "Economic Analysis of the Provision Of Roaming Services in the Wireless Service Industry," filled Nov. 30, 2009 at the FCC prepared for T-Mobile.

51. Gregory Rosston and Andrzej Skrzypacz "The FCC's 700 MHz Auction." SIEPR Policy Brief , December 2007
52. Peter Cramton, Andrzej Skrzypacz and Robert Wilson "The 700 MHz Spectrum Auction: An Opportunity to Protect Competition In a Consolidating Industry," submitted to the U.S. Department of Justice, Antitrust Division, 13 November 2007 and prepared for Frontline Wireless, LLC .
53. Peter Cramton, Gregory Rosston, Andrzej Skrzypacz and Robert Wilson "Comments on the FCC's Proposed Competitive Bidding Procedures for Auction 73," 31 August 2007 and prepared for Frontline Wireless, LLC.
54. Peter Cramton, Andrzej Skrzypacz and Robert Wilson "Revenues in the 700 MHz Spectrum Auction" Working Paper, University of Maryland, 27 June 2007 and prepared for Frontline Wireless, LLC.

PhD Students advised (original placement in brackets):

As Principal (Co-)Advisor: Yuliy Sannikov (Berkeley), William Fuchs (Chicago), Michael Grubb (MIT), Qingmin Liu (Penn), Peter Lorentzen (Berkeley), Brendan Daley (Duke), Kyna Fong (Stanford), Brett Green (Northwestern), Bumin Yenmez (Carnegie Mellon), Alex Frankel (Chicago), Songzi Du (Simon Fraser), Yair Livne (Quora), Ben Golub (Harvard), Alejandro Francetich (Post-doc at Bocconi), Felipe Varas (Duke), Dmitry Orlov (Rochester), Johanna He (Upstart), Pavel Zryumov (Penn), Erik Madsen (NYU), Piotr Dworczak (Northwestern), Isaias Chaves Villamizar (Northwestern), Enrique Ide (current), Giorgio Martini (current).

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Honors and Grants

Fellow of the Econometric Society, 2012.

Economic Theory Fellow, Society for the Advancement of Economic Theory (SAET), 2017

Senior Fellow of the RCEA (the Rimini Centre for Economic Analysis) 2018

R. Michael Shanahan Faculty Fellow for 2016-2017

GSB Trust Faculty Fellow 2014-15.

Joseph and Laurie Lacob Faculty Fellow for 2012-2013

NSF Grant #1260853 for a research project with William Fuchs "The Negative Effects of High Frequency Trading and Transparency in Dynamic Markets."

NSF Grant # 0721090 for a research project with Christopher Phelan “Beliefs and Private Monitoring.”

Joseph and Laurie Lacob Faculty Fellow for 2007-2008

Stanford GSB PhD Distinguished Service Award 2005

Best paper award, Utah Winter Finance Conference 2004, joint with Peter DeMarzo and Ilan Kremer for "Bidding with Securities: Auctions and Security Design"

NSF Grant # 0318476 for a research project with Peter DeMarzo and Ilan Kremer “Bidding with Securities - Auctions and Security Design.”

MBA Class of 1969 Faculty Scholar for 2002-2003